One thing developed countries can do to reduce their impact on the planet is to change the way they live in cities.

Many people already live in cities, especially in developed countries.

Urban dwellers in developed countries are wealthy and consume a lot.

If we can change this situation and create more compact cities,

Here's Vancouver as an example. If you haven't been there, go check it out. It's a great city.

Vancouverites are trying to build perhaps the most amazing compact city anywhere on the planet.

They're trying to keep cars out of town, which is great.

It is also necessary to manage the expansion of the city

leave nature as it is

This is the City of Portland, a real development example

This grassland will remain a pasture forever

clarified the boundaries of the city

The boundary between nature and city never changes

Then you can start investing

Effective and comfortable urban transportation systems, things that people actually want to use can be started.

It will be possible to change buildings

This is the Beddington Zero Energy Development in London, one of the greenest buildings in the world.

Now we can build buildings that are completely self-sufficient in the electricity they use, that recycle most of their water, that let in natural light, are very comfortable, and that are cheap in the long run.

"Green Roof" Bill McDonough just spoke last night, so I'll leave it out.

As people live in closer collaboration, we can use advanced information technology, for example, to build smarter spaces.

so you know what's where

Once you know where everything is, you can share it and make it available

Sharing things reduces overall usage

A great example of this is car-sharing clubs, which have just started in the United States, but are already happening in many European cities.

Why should you own a car if you only drive once a week?

Another thing that can be done with technology is how to reduce the usage of things, and monitoring the actual usage can help.

This electrical cord will glow brighter the more electricity it uses. It's a great concept, but I think it should actually be the opposite.

there might be a simpler way

For example, simply renaming

This switch has "Flood of Light" on one side and "Off" on the other.

You can change the way things are made

This is an anatomic building

Inspired by the shape of living things

Many of these buildings are very beautiful and more effective.

This is an example of biomimicry, which we're very interested in right now.

This example uses the shape of a seashell to design a very efficient exhaust fan.

A lot of great things are happening in biomimicry

If you are interested, please visit the Worldchanging site

you will find more information

There's also an area called "new biodesign," which is about using real life forms and life processes to help industry.

For example, this is hydrogen-producing algae

So, in this way, we have a new model in the bud, a model for making the cities we live in bright and green.

Unfortunately, very few people live in cities like ours.

Many people live in expanding megacities in developing countries.

There's a statistic that I use a lot, which is that every four days on Earth, there's a city of Seattle, so every four days there's a city the size of Seattle.

I was talking about this two months ago, and someone who works for the United Nations came up to me and he looked very upset and said, "You're completely wrong."

"Every seven days, it's a mistake!"

So let's say a city the size of Seattle is born every seven days.

These cities are growing at an incredible rate

Without adequate urban infrastructure, so many people are struggling in poverty and trying to figure out how to make a new life.

So how do we transform the megacities of developing countries into 'bright and green' megacities?

We need revolutionary change

there has to be a transformational change

Transformational change is like this: If you find yourself in a situation where you don't have the tools and technology you need, wouldn't it be silly to invest in the latest technology?

Looking for low-cost, readily available technology works most of the time.

For example, we are familiar with mobile phones.

Most developing countries are starting to use mobile phones directly without having to lay phone lines.

Even if you have phone lines in cities in the developing world, they're often broken and unusable, and they're expensive.

This photo illustrates the situation well

Talking on the mobile phone with Ganesha in the background

Mobile phones are becoming more and more popular in developing countries.

You heard a similar story this week, so I won't say too much, but what's true for mobile phones is true for other technologies.

The second example is a tool for "collaboration," a tool that facilitates collaboration, whether it's software for collaboration or a system of intellectual property.

When people have the ability to freely collaborate and create, they have a different kind of solution.

A solution that is accessible to those without capital is possible.

For example, there's open source software, there's "creative commons," and other copyright practices.

These things make it possible to do something like this picture

"Telecentro" in São Paulo

It's a really cool program, but it's a cheap built-up computer and open source software, and you can take things like empty buildings and create community centers where anyone can get free high-speed Internet access and learn to code.

Now 250,000 people every year, and 250,000 of the poorest

I am using this "telecentro"

The Linux penguins in the background are cute.

Worldchangin's staff finds it very interesting that there's a trend that people in the Southern Hemisphere are redefining or reclassifying themselves to make them more distinct from the people in this room.

It's not just that Bollywood isn't a Hollywood copycat.

For example, Brazilian music is not a copycat of a major label

There's a whole new kind of music happening.

Reciprocal influence produces amazing results

For example, have you ever seen the movie "City of God"?

it's a really great movie

It may not be direct, but it's an artistic example.

There are other examples of the growing ability to use culture as a tool.

These people have just gathered at an Internet mobile library in Uganda.

I've got a book that I've never had before Isn't that a great picture?

Not to be overlooked in terms of politics and civics, but also the ability of people to come together and act on their behalf in ways that have never existed before.

As I've heard in other TED Talks this week, if we're going to find new solutions, it's fundamentally necessary to change the way politics works.

I personally believe that politics needs to change, not only in countries like India, Afghanistan, Kenya, Pakistan, but also in places like the United States.

"Another world is possible" means

The famous motto of the anti-globalist movement is

Borrowing this motto

It's not about whether it's possible, it's about "another world is already here"

Instead of just imagining it as an obscure possibility, we have to make some moves towards this possibility.

You have to start like Brazilian President Lula

Who knows Lula?

You know a lot better than the average audience.

Now, President Lula has had his share of criticisms, but one of the things he's been working on is pushing the idea of ​​a whole new kind of global cooperation that's completely different from the traditional framework of North-South relations.

I will keep an eye on him

This is another example of a category of games that we call "real world" games.

spreading to various places

This is a screen shot of the game "Strong Force"

It's a video game that teaches, as you play, how to create non-violent riots and revolutions.

All of this has sparked a strong interest in democracy, especially in developing countries.

We know so little about the developing world that it's easy to forget that hundreds of millions of people are fighting for a fairer, more democratic, less corrupt society.

Too little news like that.

But the reality is that there's a lot going on everywhere, and these tools are contributing to that.

What kind of things will be possible if “innovative change” and “collaborative tools” can be used at the same time?

In short, a 'bright and green' future in the developing world becomes possible.

For example, to spread green power all over the world

This is a building in Hyderabad, India

The greenest building in the world

It also enables grassroots activities that can be done by people with little or no funding.

Here is a photo of a technician carrying solar panels on foot.

Telemedicine becomes possible

I'm a nurse from India learning how to use a PDA, through which I will be able to access the database.

Tools for people in developing countries are also available

It's an LED-powered light that gives nearly a billion people, whose night means darkness, access to the means to study and work.

It's a refrigerator that doesn't use electricity. It's designed with another jar inside.

It will also be possible to deal with water issues, which is an urgent issue.

It's a device for harnessing rainwater, which is freely available everywhere.

Distillation equipment using sunlight

In areas with high humidity, such as jungles, such nets can provide clean water.

An example of how to carry water

Transporting water is a very hard job, so someone thought, why not roll it?

great idea

Another great invention, the "life straw"

Any water you drink with this will be drinkable before it reaches your mouth.

It is very convenient for people who are in trouble without clean water.

One of my favorite "Worldchanging" stuff

It is a rotating playground equipment manufactured by Roundabout. Water is pumped up by children playing.

Seriously, it deserves praise

The same is true for those in absolute danger.

200 million refugees are projected to emerge by 2020 due to climate change and political crises

how to house these people

All over the world, people are working together to create great and humane designs.

There's also the design of behavioral models, teaching in the middle of a refugee camp.

a new form of education for displaced people

There are also new tools

this is one of the things i like more than anything

Anyone know what this is?

(Find mines)

That's right, this is a mine scavenger

It's said that there are 500 million landmines hidden on earth, and if you live in one of those areas, you can plant the seeds of this grass.

As the grass grows, if a mine is nearby, it will know it is dangerous because its roots will react with the chemicals in the mine and turn red.

In other words, a life-saving seed.

(Applause) Another reason I love this grass is that I believe that the tools that change the world must be beautiful in their own right.

It's not enough to just survive

We must create a better world

I personally believe that

Finally, the story concludes with H.G. Wells' immortal words, "A better future awaits us.

All the past is just the beginning of the beginning,

Everything that man has done is just a prelude to what man has yet to do. ”

i hope this is true

You gave me confidence like never before

Thank you very much

(applause)

As a magician, my goal is to make people stop and think.

I'm also pushing myself to the limits that doctors told me I couldn't do.

In April of 1999, I was put in a coffin and buried in New York City for a week.

All I ate during that time was water.

It was so interesting that I wanted to do more similar experiences.

Then in New York City, I was frozen in an ice block for three days and three nights.

this was more difficult than expected

And then I stood on a 30-meter-high pole for 36 hours.

I had a strong hallucination and saw the building behind me as the head of a large animal.

and then go to london

I lived in a glass box on water for 44 days.

For me, this was the most difficult challenge I have ever faced, but it was also a self-fulfilling experience.

There were a lot of skeptics, especially in the London press, and they flew helicopters around the box, showing off cheeseburgers, to lure me in.

(Laughter) I was relieved when it was published in the New England Journal of Medicine as a scientific study.

And then I wanted to see how long I could hold my breath, how long I could hold out without even air.

Little did I know then that this would be the best experience of my life.

As a kid, I was obsessed with Houdini's underwater records.

At first, I competed with my friends to see how long I could hold my breath underwater.

When I was a teenager, I could hold my breath for three minutes and thirty seconds.

Later it turned out that this was the same as Houdini's personal best.

In 1987, I heard the story of a boy who accidentally fell through a crack in the ice and was trapped in a frozen river.

He didn't breathe and survived for 45 minutes in the river.

Rescue crews arrived and resuscitated him, but there was no brain damage.

His core body temperature had dropped to 25 degrees.

As a magician, I believe that nothing is impossible.

I believe that if someone can do it, others can do it.

I began to think that if the boy had survived that long without breathing, there must be a way for me to do the same.

So I met a top neurosurgeon

How long can you hold your breath? I asked you how long you can go without air.

The doctor told me that any situation longer than six minutes is a serious risk of hypoxia in the brain.

When I heard that, I thought it was a challenge.

(Laughter) So my first attempt was to do something similar. I built a tank and filled it with ice and freezing cold water.

I went inside, thinking it would lower my core body temperature.

I was shivering at this first attempt

didn't last a minute

I knew this method would never work.

So I went to my friend who is a doctor and asked what I should do.

“I want to hold my breath for a long time, but what should I do?”

And he said, ``David, you're a magician.

(Laughter) And then he came up with the idea of ​​making a rebreather. He took a tube from the hardware store and taped a balloon to it to make something like a carbon dioxide scrubber.

It's a little unsightly

here is the attempt

it was obviously impossible

(Laughter) And I actually started thinking about liquid breathing.

There is a drug called Perflubron

The oxygen levels are so high that in theory you can breathe in it.

So I got my hands on the chemical, filled the sink, put my face in it, and tried to inhale it, but it was really impossible.

It's like the doctor said, it's like trying to breathe with an elephant stepping on your chest.

Then the idea disappeared

And then I figured if I could put on a cardiopulmonary bypass machine, put a tube in my artery, oxygenate my blood, and make it look like I wasn't breathing.

This was also a silly idea

And I finally came up with this insane idea, which is doable.

(Laughter) You actually hold your breath until it's past the time doctors think you're brain dead.

So I decided to look into pearl fishing.

They dive for 4 minutes in one breath

While doing this research, I discovered freediving.

i think i had the best meeting

There are various competitions in freediving.

Things that compete for diving depth

have static apnea

It's about holding your breath for as long as you can without moving in one place.

what i learned was this

The first thing I learned was that when you're holding your breath, you're wasting your energy, so you should never move.

You can't move because you'll run out of oxygen and have more carbon dioxide in your blood.

Then I learned how to lower my heart rate

Never move, relax, think of yourself as something outside your body, and just control it.

I also learned how to purge

Purge is hyperventilation

Inhale and exhale...and you'll feel dizzy and tingling as you do this.

carbon dioxide is removed from the body

So it becomes very easy to hold your breath.

Then take a deep breath, hold your breath and relax, never let the air out, just stay there and endure all the pain.

For months, the first thing I did when I woke up every morning was to hold my breath, and out of 52 minutes, I held my breath for 44 minutes.

In short, when you purge, breathe hard for a minute

Shortly after that, I held my breath for 5 minutes and 30 seconds.

And then you breathe in for another minute, expelling as much carbon dioxide as possible, and shortly after that, you hold your breath for another five and a half minutes.

did this 8 times in a row

Out of 52 minutes, you're only breathing for 8 minutes.

Getting completely dizzy near the end

I feel like I'm walking in a daze

then i get a terrible headache

At this time, even if you talk to me, you can't have a decent conversation

We also looked at world record holders

A man named Tom Sietas

I have the perfect body to hold my breath

Height 193cm Weight 72kg

total lung capacity is twice the average

I'm 180cm tall and I'm a bit overweight

Let's call it boned

(Laughter) I had to lose over 20 kilos in three months.

So I thought of everything I put into my body as medicine.

Everything you put in your mouth is for nourishment.

I ate a small amount of controlled food at each meal.

And my body has adapted

<There are individual differences> --- (laughs) I was able to hold my breath for a longer time the thinner I got.

With a good diet and hard training, I managed to get my resting heart rate down to 38 beats per minute.

This is lower than most Olympic athletes.

After four months of training, I was able to hold my breath for over seven minutes.

I wanted to challenge myself to hold my breath in various places.

I wanted to try it in a variety of extreme situations to see if I could lower my heart rate under force.

(Laughter) I decided to break the world record with a prime time show.

The world record is eight minutes and fifty-eight seconds, held by Tom Sietas, who I mentioned earlier, has lungs like whales. (Laughter)

We set up a fish tank at the Lincoln Center and thought that if we could stay there for a week without eating anything, we'd become accustomed to it, slowing down our metabolism and allowing us to hold our breath longer.

was completely wrong

Enter the sphere one week earlier than the scheduled relay date

i thought everything was going well

Two days before trying to break the record, a TV producer thought it would be too boring to show someone holding their breath and about to drown on TV.

(Laughter) So I had to hold my breath to undo the handcuffs.

this was a fatal mistake

This action wastes oxygen.

When seven minutes had passed, I had a severe convulsion.

At 7 minutes and 8 seconds, he began to lose consciousness.

At seven minutes and thirty seconds, I had to have my body pulled out.

failed on every level

(Laughter) So the only way I could think of to get out of my slump was to call Oprah.

(Laughter) I told her to increase the difficulty and hold her breath longer than anyone ever did.

This is a different sport than before.

The Guinness world record for pure oxygen static apnea was 13 minutes.

First, you inhale pure oxygen, which oxygenates your body and expels carbon dioxide, allowing you to hold your breath longer.

I realized that the real competition was the beaver.

ANIMAL BREATH CHART -- (Laughter) In January of 2008, Oprah gave me four months to prepare and train.

I slept in a hypoxic tent every night.

A hypoxic tent is a tent that reproduces the air pressure at an altitude of 4600m.

It's like Everest base camp

By doing this, you can train the red blood cells in your body to carry more oxygen.

Even during this training, every morning when I got out of the tent, my head was dizzy.

I set a record of 15 minutes on my first attempt.

it was a pretty big success

He was pulled out of the water by a doctor, because he knew in 15 minutes that his brain would be destroyed and he would be brain dead.

I was taken away, but I was fine

There's one person who wasn't impressed by this at all.

My ex-girlfriend when I was breaking records for the first time behind the scenes.

she was checking all my emails on my phone

(Laughter) My brother has a picture of it. (Laughter) And then I officially announced that I was going for the Sietas record.

Sietas responded by breaking his record on the morning talk show.

Then his rival broke the record again

He suddenly pushed the record up to 16 minutes and 32 seconds.

This was three minutes longer than I had prepared.

I beat the original record

I now want the Science Times to document this.

I wanted it to be featured in the article

So I did what anyone who takes science seriously does.

I went to the New York Times office and did card magic for everyone.

(Laughter) I don't know if it was because of that magic, or because of the Cayman Islands rumors, but John Tierney came over and seriously considered the challenge of holding his breath.

I want to impress him

I did a dive of just under 50 meters, which is about as deep as a 16-story building, and I passed out in the water on my way up, and that's dangerous, because you could drown.

Luckily, Kirk saw me and swam up to pick me up.

It was around this time that I began to fully concentrate.

I trained perfectly so that I could hold my breath until the record.

But preparing for a live TV show like Oprah was impossible.

I wish I could have floated in the pool with my face down during practice.

TV required me to be upright so I could see my face.

Another problem was that the suit was too buoyant, so I had to strap my legs to keep me from floating.

I had to use my entire leg to keep it from slipping off the loose laces, which was a big problem for me.

I'm so worried about the string that my heart rate goes up.

In addition, the first experience was that the heart rate monitor was right next to the sphere I entered.

that it was installed

It makes a beeping sound with the beating of the heart This sound is so loud

more nervous

I can't get my heart rate down normally

I started with a heart rate of 38 and I was able to get it down to 12 while holding my breath, which is pretty amazing.

(Laughter) This time we started at 120.

It didn't go down at all. For the first five minutes, I was in the water, desperately trying to get my heart rate down.

I sat still and thought, 'If I don't get my heart rate down, I'm going to fail.'

It made me even more nervous

My heart rate kept going up and it hit 150.

This is the same failure at Lincoln Center

I wasted my oxygen

When I got to the halfway mark of eight minutes, I was 100% sure this attempt was going to fail.

Achieving a record was almost impossible

Oprah dedicates an hour to this breath-holding attempt, and if we're ahead of our target record, we're not a record, but a disappointed man's show.

(Laughter) So I figured I'd be better off trying to keep trying to beat the record and falling unconscious in the water, so at least I could be pulled out and given first aid.

(Laughter) I survived until 10 minutes, at the 10 minute mark.

Begins to feel sharp, tingling pains in fingers and toes

This is due to a change in blood flow, where blood is no longer going to the extremities to oxygenate the vital organs.

At the 11th minute, I felt a throbbing sensation in my leg, and then my lips felt really weird.

At 12 minutes my ears started ringing and my arms went numb.

I'm a hypochondriac, and I remember arm numbness was a precursor to a heart attack.

I became more anxious than necessary

Then, at 13 minutes, my whole chest started hurting, probably from hypochondria.

this was terrible

At 14 minutes, my body started contracting abnormally, like an urge to breathe.

(Laughter) At 15 minutes, my heart was severely deprived of oxygen.

A focal anemia began to develop in the heart.

Heart rate went from 120 to 50 to 50 to 150 to 40 to 20 to 150 again.

With or without beating

I felt the repetition

I thought I was going to have a heart attack

So at the 16th minute, I took my leg out of the leash. If I had a heart attack, rescuers would have to dive in to unleash my leg before they could pull me up.

So I took my feet off and started floating towards the surface

But I didn't put my head out

Then I floated, just waiting for my heart to stop, just waiting

The doctor was also sitting there waiting.

Then suddenly I heard a cry

i thought i died or something happened

Then I realized that I had reached the record of 16 minutes and 32 seconds.

And then, with the excitement of the people there, I decided to just keep pushing the record.

The record was extended to 17 minutes and 4 seconds

(Applause) As if those records weren't enough, I immediately went to the clinical laboratory, took as many blood samples as I could, ran all the tests, got the readings, so the doctors could use the records again.

I didn't want to be questioned about the record again.

I wanted my world record to be legitimate.

The next day in New York City, I was walking out of the Apple store when a kid came up to me and said, "Hey Dee."

"what?"

"If you really held your breath that long, why weren't you wet when you came out of the water?"

I said, "What?"

(Laughter) This is my life... (Laughter) As a magician, I try to show you the impossible.

Whether you decide to hold your breath or flip a card, I think magic is pretty easy.

Magic is a practice, a training, a practice, a training, an attempt to do your best through pain.

that's the magic for me thank you

(applause)

Now is the most exciting time to see new Indian art

Contemporary artists are interacting with the world more than ever before.

I thought it would be interesting to give a lot of the veterans and local collectors here today a new perspective on the 10 artists I want to introduce to all of you at TED.

First, Bharti Kale

A central motif in Bharti's method is the ready-made store-bought bindi that millions of Indian women wear on their foreheads every day as part of their marriage ritual.

But the original meaning of bindi was as a symbol of the third eye between the religious and spiritual worlds.

Bharti's attempt is to liberate this mundane and explode it into something grand.

She also uses a bindi to completely cover fiberglass sculptures, including life-sized animals, to create a strong symbolism.

She said she started with 10 bags of bindi, but then she started thinking about what she could do with 10,000 bags.

Next up, Balasubramaniam stands at the crossroads of sculpture, painting and installation, creating amazing works in fiberglass.

Barra himself will be giving a talk at TED later, so I won't go into too much detail about him right now, but I'd like to add that his specialty is making the invisible visible.

Cheetra Ganesh, who lives in Brooklyn, is best known for her digital collages, mostly based on Indian cartoons called Amar Cheetra Katas.

These comics are the foundation for children, especially diaspora children, to learn folk tales about religion and mythology.

I was immersed in this myself

Cheetora mixes and re-names these icons to represent the sexual and gender political issues embedded in this seminal comic.

The same theme is also taken up in the installation work

Jitish Karat's work spans the fields of photography, sculpture, painting and installation.

As you can see, he's heavily influenced by graffiti and street art, and his hometown of Mumbai is an important part of his work.

It perfectly captures the density and vibrancy that characterizes modern, urban Bombay.

He also creates ever-changing sculptures made from raison cast skeletons.

In this piece, he imagines the wreckage of a burning auto-rickshaw that he witnessed during a riot.

Next artist N.S. Harsha has a studio here in Mysore

His approach is to modernize the tradition of miniatures

He creates small, delicate images and repeats them on a huge scale.

He uses scale to create even more astounding effects, whether it's the roof of a temple in Singapore or an ambitious installation of 192 working sewing machines stitching the flags of United Nations member states.

Mumbai-based Druvi Acharya draws on her beloved comics and street art to critique the roles and expectations of modern Indian women.

She also looks for ingredients from Amar Cheetra Katas, but in a completely different way than Cheetra Ganesh.

In this work, by extracting the part of the picture and leaving only the text, it is innovative and provocative.

Rakib Shaw was born in Kolkata, raised in Kashmir and trained in London.

He is also working on the redevelopment of miniature art.

Inspired by Hieronymus Bosch and old cashmere fabrics, he creates gorgeous canvas paintings.

He then applied metallic industrial paint with a porcupine needle for a rich, subtle effect.

Now I'm going to cheat a little bit, because Lux Media Collective is actually a collective of three artists.

Lux is perhaps one of the leading figures in contemporary Indian multimedia art, working across photography, film and installation.

He mainly explores themes of globalization and urbanization, and his hometown of Delhi is a frequent element in his work.

Here, viewers analyze crimes based on evidence and clues embedded in a story on five screens, where the city itself may be a suspect.

Next up is Subo Gupta, probably the greatest contemporary Indian artist.

He began to be known for his realistic paintings of everyday items such as metal kitchen utensils and tableware familiar to Indians.

He comprehensively celebrates these local commonplaces and makes them even more spectacular by incorporating them into giant sculptures and installations.

And finally, the tenth artist, Ranjani Shetar, based in Karnataka, creates graceful sculptures and installations that blend the natural and the artificial, making the local global like Subo.

These are wires wrapped around a woolen fabric and dyed with vegetable dyes.

And she did a good job of designing it so that viewers could walk around and enjoy it.

Light and shadow are also an important part of her work.

She also explores themes of consumerism and the environment. Objects like this basket, for example, look natural, but they're actually woven from metal scraps and car scraps found in bungalow industrial dumps.

10 artists in 6 minutes, it was a great amount of information

I just hope you've been inspired to see more of what's happening in the Indian art world right now.

Thank you for watching and listening

(applause)

This is a painting in the library at Harvard Medical School.

It depicts the first organ transplant.

In the foreground, Joe Murray prepares a patient for a transplant, and in the far room, Harvard's head of urology, Hartwell Harrison, removes a kidney.

In fact, the kidney was the first organ transplanted into humans.

That was in 1954, 55 years ago.

Decades later, we're still facing the same challenges.

Of course, there have been many medical advances, and many lives have been saved.

But we are facing a serious organ shortage.

The number of people on the waiting list for organ transplants has doubled in the last decade.

On the other hand, the number of organ transplant operations has barely increased.

This is due to aging

because it has a longer life

We are living longer because of advances in medicine.

But as we age, our organs tend to lose function.

It's a challenge, and it's not just organs, it's tissue.

We're trying pancreatic transplants and nerve transplants to alleviate Parkinson's disease.

these are serious issues

We have amazing stats

Every 30 seconds, a patient who could be saved by regenerating a body part or receiving a transplant dies.

So what can we do?

I'm talking to you tonight about stem cells.

That's the way we should take

But there's a long way to go to bring stem cell therapy to clinical use.

Wouldn't it be great if your body could regenerate?

Wouldn't it be great if we could actually harness the power of our own bodies to heal us?

It's not a concept that's far from the norm, it's actually happening on the planet every day.

this is a picture of a salamander

Salamanders have amazing regenerative abilities

What you see in the video

It's a salamander's injured leg.

Here's a picture of a real salamander's leg over time as it regenerates in a matter of days.

You can see the scarring

A new leg grows out of the scar

Salamanders can do this

You might wonder why humans don't have the ability to regenerate.

we also have the power to regenerate

Your body is made up of many organs, and each organ has a group of cells that come into play when it's damaged, and regeneration happens on a daily basis.

as you get older

Your bones regenerate every ten years.

Your skin is also renewing itself every two weeks.

Your body is constantly being regenerated.

The challenge of regeneration begins when the body is injured.

When you get hurt or sick, your body first tries to contain the wound or disease from spreading to other parts of your body.

It tries to contain the infection from spreading to other parts of the body, whether it's an organ or the skin. The first reaction is to create scar tissue to keep the outside out.

Is there a way to use it?

One of them is actually being put to practical use with smart biomaterials.

Let's see how it can help. The picture on the left is a damaged urethra.

This is the tube that leads from the bladder to the outside of the body.

hurt like this

First, we discovered that we could use that smart biomaterial as a bridge.

If you can create a bridge and isolate it from the outside environment, the cells will regenerate, cross the bridge, and form the urethra.

this is how it looks

This is the smart biomaterial that we actually used to treat this patient.

What you see on the left is a damaged urethra.

Using biomaterials in the middle

And six months later... on the right is the regenerated urethra.

Our bodies can regenerate, but only for short distances.

It is said that it can only be reproduced at a distance of up to 1 cm.

Even with smart biomaterials, we can only bridge up to 1 cm.

We can only regenerate over short distances.

What if a larger organ is damaged?

What if the tissue damage is much larger than 1 cm?

In times like these, cells come into play.

The strategy here is this: a patient comes in with a problem with an organ, and you take a tiny piece of tissue from that patient's organ, less than half the size of a postage stamp.

To the naked eye, it looks like a piece of clothing, but this substance is actually very complex and designed to be broken down in the body.

After a few months it will decompose

So it's used to place the cells in the right places.

It carries cells around the body so that new tissue can regenerate, and when the tissue regenerates, the skeleton disappears.

I'll show you how to use your muscles

This shows how muscle tissue and its structure can be used to build new muscles.

They take the cells out, multiply them, put them on a scaffold, and put the scaffold back into the patient's body.

But before we put that skeleton back into the patient's body, we put the skeleton into motion.

The transplanted muscle tissue is exercised so that it can perform its natural movements within the patient's body.

Here's what it looks like in motion, and you can see the muscle bioreactor moving the muscle back and forth.

This is flat tissue — muscle.

But what about other organizations?

This is a blood vessel created by regenerative medicine.

It's similar to the process of building muscle, but a little more complicated.

First we prepare the skeleton, the skeleton is like a sheet of paper.

shape it into a cylinder

create blood vessels in a similar fashion

Blood vessels are made up of two types of cells

Put muscle cells on the outside of the tube to create a layer cake using muscle cells

I will paste

Arrange vascular endothelial cells on the inside

a framework in which cells are implanted

Place in an oven-like device

It's set to 37 degrees Celsius and 95 percent oxygen, just like the human body.

I'm going to move the blood vessels like in the previous video.

The artificial carotid artery is visible on the right.

The carotid artery is the artery that connects the neck to the brain

In this x-ray, you can see that the blood vessel we created is open and working.

Things like blood vessels and urethra are more complex tissues because you're introducing two different types of cells.

They act as conduits

Allows for a steady flow of liquids and air

tubular tissue

It's not as complicated as an organ with a lumen, because an organ with a lumen works in response to the situation.

the bladder is one such organ

The method is the same, cut from the bladder less than half the size of a postage stamp.

It loosens up that tissue and separates it into two specialized cellular components: muscle and bladder.

increase cells in vitro

Cells removed from an organ can be cultured in about four weeks.

And shape the skeleton into a bladder-like shape.

Lined with cells from the inside of the bladder

And it's covered on the outside with muscle cells.

and put it in a device like an oven

Six to eight weeks after a piece of tissue is harvested, the artificial organ can be put back into the patient's body.

this is the actual skeleton

This substance is covered with cells.

When we did our first clinical trials, we built scaffolds for each patient.

Six to eight weeks before the surgery, we had the patient come in, and after taking x-rays, we created a scaffold specifically for the size of the patient's pelvic cavity.

And for the second phase of the clinical trial, we pre-built scaffolds in small, medium, large, and extra-large sizes.

(Laughter) It's true.

Do you like extra-large?

(Laughter) The bladder is obviously a little more complicated than the other organs.

Some organs have even more complex lumens.

This is an artificial heart valve that we made with regenerative medicine.

Making a heart valve is a similar method.

We seed the scaffold with cells, and as you can see, the valves are open and closed.

Before transplantation using the same method

put these organs into motion

And the most complicated are the solid organs.

Solid organs are more complex because they require far more cells per cubic centimeter.

ears for example

where the chondrocytes were seeded

Then you put it in a device like an oven.

And after a few weeks, we can take out the cartilage skeleton.

This is where I'm making my fingers

It's stacked layer by layer.

put your muscles on top

Stack layers of tissue without gaps

Again, it's a pretty complex organ, but by far the most complex solid organs are those that are highly vascularized, such as the heart, the liver, and the kidneys.

There are several ways to create solid organs, and this is one example.

we use a printer

use cells instead of ink

this is a normal printer

This is a layer-by-layer printing of a model of a biventricular heart.

The heart begins to form, and in about 40 minutes it finishes printing, and after four to six hours, it begins to contract.

(Applause) It's a technology developed by Tao Ju, who was in our lab.

This technology is experimental and not yet available to patients.

We also used decellularized organs.

Using donor-donated organs, we use mild detergents to remove all cellular components from these organs.

The left figure and the upper figure are the liver.

They use donor livers and use mild detergents to remove all the cells from the liver.

After two weeks, you can lift this organ. It looks and feels like a real liver, but without the cells.

When you remove the liver, you're left with a skeleton made of collagen, which is a substance found in the body, so it doesn't cause rejection.

Can be used on any patient

And we can use this vascular tissue to show that vascularity can be maintained.

this is fluorescence angiography

what you are seeing

Injecting a contrast agent into a decellularized liver.

You can see the vascular tree is intact.

There, we perfuse the patient's own cells into blood vessels that branch out like trees, outside the liver.

Perfuse the patient's own liver cells

and you can have a functioning liver

that's what you're looking at

It's still experimental, but we've successfully replicated liver function.

Moving on to the kidneys. On the first slide of my talk, I showed you the first drawing of a kidney transplant.

Another way we're trying is to make wafers and stack them like an accordion.

Stack wafers made of kidney cells.

This is the little kidney that we built.

actually make urine

The challenge of how to make small structures bigger is now being tackled in our lab.

One of the things I wanted to talk to you about is the strategy that regenerative medicine is trying to take.

If possible, I'd like to use off-the-shelf smart biomaterials to regenerate patients' organs.

The gap that can be regenerated is limited, but the goal is to increase that distance.

If you can't use smart biomaterials, use your own cells.

because it does not cause rejection

I'm going to take a cell out of you, build a structure, put it back in you, and there's no rejection.

If possible, I prefer the cells of the organ I'm trying to make.

If you have a problem with your trachea, I'd like to use cells from that person's trachea.

If there's a problem with the pancreas, they take pancreatic cells.

The reason is that the cells you take know what they are.

Because tracheal cells know themselves to be tracheal cells,

I don't have to tell you what kind of cell it will become.

So organ-specific cells are good.

Now, we can get cells from most organs, except for the heart, liver, nerves, pancreas, and we still don't know about that.

you need stem cells

If we can't use the patient's own stem cells, we use donor stem cells.

select cells that are non-rejective and non-tumor-forming

One such property is stem cells, which we reported two years ago, stem cells that can be harvested from the amniotic fluid or the placenta.

We're working on that research, and I'd like to talk to you about some of the challenges.

All of these things look fine, but they're not. These techniques aren't that easy.

Some of the things I've shown you today are the work of more than 700 researchers in our lab over the last 20 years.

very difficult technology

If you find the right experimental method, you can reproduce it.

the road is long

I often show you this cartoon.

How to stop a runaway carriage

In the picture above, the driver of the carriage follows the backs of the horses to the lead horse.

Stop the last runaway carriage

It's the scientist's way, and the bottom one is the surgeon's way.

(Laughter) As a surgeon, I can't laugh.

(Laughter) But the above method is the right approach.

And what that means is that whenever we start using a technology like this in a hospital with patients, we make sure that we've done everything we can in the lab before we do it.

And I make sure that before I apply these techniques to my patients, I ask myself some really tough questions.

Ask your loved one if it's okay for you to have this organ transplant, and if the answer is yes, then move on.

Because our number one goal is to do no harm.

So I'm going to show you a very short video of a patient who received a cultured organ transplant.

We started transplanting these tissues over 14 years ago.

So there are patients who have been doing well for over 10 years with artificial organs like this one.

The young female patient I'm about to show you

I suffered from spinal cord bifida, a birth defect of the spinal cord.

She had trouble urinating. It's a scene from a CNN show.

Please give me 5 seconds

It's a show that Sanjay Gupta is involved with.

I'm happy. I was always afraid something would happen.

But now I can go out with my friends and do whatever I want.

Ultimately, regenerative medicine is trying to do one thing.

It's very simple, it's about making the patient better.

Thank you for your attention

(applause)

Can geographic information make you healthier?

2001 I have a heart attack

was hit by a train

I found myself in the intensive care unit, recovering from emergency surgery.

i didn't know what

I asked myself "Why me?"

"Why now?" "Why here?"

"Couldn't the doctor have warned you?"

I want to talk to you today about the secrets of a healthy life.

Genetics Lifestyle Environment

If you manage the risks that these pose, you'll live a healthier, better life.

I'm well aware of genetics and lifestyle.

But why

Because doctors always ask me this.

Have you ever had to fill out that long form at the hospital?

If you're lucky, you'll be blessed with such opportunities from time to time.

(Laughter) And each time, they'll ask you the same questions over and over again... and they'll ask you questions about your lifestyle, your family medical history, your prescription history, your surgery history, your allergy history, and so on.

But when it comes to the environment, I don't think either I or doctors understand very well.

What does environment mean?

There seems to be various ways of understanding

This is my life, these are my living spaces

everyone is the same

Have you ever lived in a few different places?

Think about it. Looking back, in many unexpected places

I know you're spending your time

work or anything else

If you're like me, you probably spend a good deal of your time traveling on planes.

Yes, the questions about where you live and work are surprisingly complex.

And where are you exposing yourself to unseen risks?

I spend about 75 percent of my life in one place, most of the time

The result is that I live without leaving it.

Have a look at this

Started in Scranton, Pennsylvania

I don't know if there are people from my country here, but this is where my young lungs spent 19 years.

I inhaled unspecified amounts of high concentrations of sulfur dioxide, carbon dioxide, and methane for 19 years.

If you've been here, you know that this is what a pile of burning, smoldering coal waste looks like.

I left this area and moved to the Midwest.

I will live in Louisville, Kentucky

I settled down near an area called Rubbertown.

They produce plastics, and they use a lot of chloroprene and benzene.

I spent 25 years here in my middle-aged lungs, breathing air enriched with those chemicals.

It's always like this on sunny days, but you can't see it

It was being eroded slowly but surely.

And finally, I chose a job on the West Coast.

Moved to Redlands, California

It's a good feeling, where they filled my old lungs with particulate matter, carbon dioxide and high concentrations of ozone.

It's the highest concentration of ozone in the country

Even if the weather is fine, this is the view

Do you know anyone who has been here?

What is the problem with this?

There is something really missing

That doesn't happen in a hospital "Where have you lived?"

No doctor has asked

What kind of quality of water, food, etc. was ingested?

don't ask

look at this data

It's been collected from all over the world, and many countries have invested billions of dollars in research like this.

I put a circle around where I lived

Apparently, the place I was in was the perfect place for a heart attack.

in white space

How many people have spent most of their lives

you're lucky

Who was in the red space?

hmm not good

There are dozens of maps like this in atlases around the world.

These give clues to disease factors.

but in our chart

there is nothing like this

colleague paul

For the last two years, I've had him track his cell phone every two hours of the year, recording every place he's visited.

You can see that he has been to several places in the country.

This is where he spent most of his time

If you look closely, there's a hint of what Paul's hobbies are.

Do you understand? Yes! It's skiing!

If you zoom in further, you can see the details of where he spent his time.

This black dot represents a toxic release site identified by the US Environmental Protection Agency.

Did you know that such data exists?

Any community in the United States can create this personal map.

Now you can create a location history on your mobile phone

Like Paul did with his iPhone

entering the examination room

A doctor with this map sitting on a chair waiting, isn't it like this?

and the doctor

You'll look at it and say, "Bill! It's always warm here in beautiful California, so why not go jogging at 6pm?"

Based on the results of this report, it is not recommended."

I would like to entrust you with two tasks.

The first is to teach our doctors the importance of geographic information.

It's called geomedicine, and there are multiple projects underway around the world.

still in early stages of development

We need your support, and we need to teach future doctors the importance of what I've told you today.

The second is to spend billions of dollars on creating electronic medical records, and at the same time, make sure that this geographic history is in the medical records.

This is important not only for doctors, but also for researchers, and for us as well.

it's useful

If I had known this, I might not have moved to America's ozone capital.

I might be able to negotiate a move with my boss, both for the company and for myself.

Jack Lord said "geography is the key to medicine"

said so

And that's the conclusion of the Dartmouth Atlas, that geographic variation has a huge impact on disease, health, and health care systems.

in those words he said

10 years ago he knew

I want this geographic information to take a chance on our charts.

I'd like to leave you with this view of mine, geographic information is very important.

I believe it can make us healthier Thank you

(applause)

Narrator: Impressions of an event from one point of view and

When you change your perspective, it's often the case that the impression is completely different.

You can't understand what's really going on unless you see the big picture.

Sascha Vucinić: Do you like this video?

This 29-second video is far more effective than an hour of me preaching the power and importance of independent media.

So I thought it would be appropriate to use it at the beginning.

And let's talk a little bit about statistics.

According to researchers in this field, 83 percent of the planet's population lives in societies without independent media.

What do you think of this number? 83% of the planet's population don't know what's really going on in their country.

The information they get is information that someone censored, distorted, manipulated, or otherwise manipulated.

We're deprived of the means to make sense of reality.

I hope this gives you an idea of ​​the scale and significance of this problem.

Now, fortunately for you, the remaining 17 percent of society, you should enjoy it as long as it stays that way.

Flipping through the newspapers on Sunday mornings and drinking cappuccinos

Have fun while you can

Because, as you probably heard yesterday, just as you can remove a star from the flag, you can also remove the freedom of the press.

but that's another topic

back to my story

What I want to talk about goes back to 1991.

At that time, I was running B92, the only independent media in Serbia and the only electronic media in the country.

We had a typical day as the only independent media in conflict-ridden Serbia, where the government had its eye on us.

I've experienced a lot of things.

A little intimidation, a little friendly advice, a little financial intervention, a little censorship.

But one of the most troubling aspects of government tactics, which began in the late '90s, is to intimidate advertisers if the government doesn't like the independent media.

Once an advertiser is intimidated, they lose their influence in the market, they stop advertising, and they never advertise again, no matter how effective the medium is.

Then it will not be profitable

So, in the early '90s, I had these problems. One was the survival of the company.

It was just being in a country that was falling, a country that was slowly falling in slow motion.

I still have the tape that recorded it all.

I had a way of understanding what was really going on.

I wanted to record history.

But the tapes had to be overwritten every week, because otherwise there wouldn't have been enough tapes to archive that history, and they couldn't be procured.

Well, it's basically like this, but I'll omit the details because it's going to be long.

In this situation, someone visited my office.

It was 1991

He ran a media systems company, a company that still exists today, and he's still going.

What did I know about the media system at the time?

I thought of the media system as an organization that helped companies like ours.

So for the meeting, I came up with two plans, a strategic plan, one small and one large.

The small thing is to ask them to procure the tapes so that we can keep a record of the times 50 years from now.

The big one is asking for a million dollar loan.

Because I still believe that serious independent media companies are a great business.

I thought that if only Milosevic left, B92 would survive and be a great company, and it did.

It's now the first or second largest media company in Serbia.

So at the time, I thought the only thing I needed was a million-dollar loan to get me through the tough times.

In a nutshell, he came to my office, well-dressed.

And then I gave a presentation that I thought was brilliant, and I explained the political situation and how devastating war can be.

Well, in terms of cruelty, I think it wasn't enough, now.

Anyway, after a long epic explanation, the only question--I'm kidding, but it's true--Are you paying for Michael Jackson's songs? was

that was the only question

After he left, I remember feeling very angry with myself, because I thought there must be an institution in the world that would provide financing to media companies.

Because it's obvious to anyone, isn't it? Someone must have thought of it.

And it should have started as a business.

So I thought it was just because I was stupid that I couldn't find it.

Excuse me, Google didn't exist back then, you couldn't google it in '91.

I thought I had a problem

Now fast forward to 1995

I left the country to meet with George Soros to convince him, for the third time, that his foundation should invest in an organization that acts like a media bank.

my argument was very simple

Charity is out of the question, it doesn't make sense

I don't need alms, $20,000 won't help anyone

What George Soros Should Do is Treat Media Companies as Businesses

business is everywhere

Whether you're in the media or any other business, you need the same investment.

What we really need is access to capital.

This third meeting went pretty well.

Finally, he said, "It's not going to work. You'll never get your money back. But my foundation is giving me $500,000, so you can try it.

You know it won't work."

And he said, "I'll give you a rope to hang yourself."

(Laughter) After the meeting, I knew two things.

First of all, I'm not going to hang myself under any circumstances.

The second is that I have no idea how it works.

It's a great concept

But having a concept and making it a reality are two different things.

I had no idea how to do it

I had the wrong idea.

Banks -- there may be bankers here, so I apologize in advance -- they're the best jobs in the world.

Find someone who's decent and has a lot of money

Give me more money and I'll pay you back in time

collect interest and do nothing in the meantime

There is no reason not to do such a good business! I thought

(Laughter) I found my first client Yay! I thought

Slovakia's first independent newspaper

Because of the government, none of the printing presses in Bratislava can be used.

It was a daily newspaper, but it had to be printed 400 kilometers from the capital.

Because of this distance, the deadline for articles in the morning paper is 4 p.m.

So no sports articles, no latest news because it's too late, circulation is dropping.

It's a very smart and sophisticated way to economically kill a daily newspaper.

Such a newspaper company asked me for a loan.

I thought the only way to survive was to buy a printing press.

I said, "Okay, see you." I brought him my business plan.

the meeting begins

I got these two sheets of paper, they're A4 size, but they were bigger.

there were a lot of numbers countless numbers

But no matter how you rearrange the numbers, nothing comes out of it. It's not convincing.

And that's what they do best

Our Loans Are Our Reliance

I found my methodology here

Don't bank. You have to go out there and solve problems and get rewarded for it.

For the time being, the results

Grow to $40 million loan in 10 years Average interest rate is 5-6%

Lately I've been adventurous and even made it to 7%

We do business like this in 17 developing countries.

and the most amazing number

The repayment rate that Soros was most worried about -- a whopping 97%

97% of scheduled payments are paid on time

What is the target of the loan?

Everything a Media Company Needs Everything from printing presses to broadcast equipment

Most importantly, loans, stocks, leasing, in whatever way you see fit to help somebody.

The most important thing is who to invest in.

We've invested in the best media companies in the developing world in the last 10 years, and we believe that.

At the end of the day, it's enough to complete the "Meishiroku"

I could talk for hours about the people I invested in, because they're heroes, so to speak.

I'm only going to talk about one of them this time, and if time permits, I'll talk about the other one.

Starting with Eastern and Central Europe and then Russia

The first loan in Russia was in Chelyabinsk.

There should be less than half of the people who have heard of this place name.

It's the south of Russia, and there's a man named Boris Nikolayevich Kirsin, who publishes an independent newspaper.

This town was closed until the early '90s because it produced glass for the Tupolev aircraft.

Anyway, he runs an independent newspaper.

After two years of our involvement, it became the best local newspaper.

Governor asked him one day, actually called him to his office

When he came he said, "Boris Nikolayevich, you are doing well, the best newspaper in the district.

I want to do business with you

Could you give me your newspaper for the next nine months? Because there's an election -- there's an election in nine months

I'm not running for office, but it's important to me who will replace me.

So if you give me 9 months, I'll give it back after that

I'm not interested in the media business.

How much should I take out? ”

Boris: "Our newspaper is not for sale."

Governor: "Then I'll close you down."

Boris: "I can't do that"

But six months later, the newspaper was forced out of print.

Luckily, Boris moved all of the company's assets to the new company, took out the subscriber list, and rehired the staff in time.

So what the governor got was an empty shell.

But these things are very common in the independent media, and for independent media bankers.

It's a perfect story

And while we were doing that, we opened the Media Management Center.

And we set up a media lab, which is really rewarding.

But there is another way of looking at this

A different perspective like the video I showed you at the beginning

A top-down camera that captures the whole picture might make you reconsider this number.

$40 million over 10 years 17 countries

That's not a big number, is it?

In fact, it's just a drop in the ocean

It feels like nothing compared to the importance of the issues that were discussed in last night's session, compared to yesterday's theme of Africa and, say, $50 billion of funding for Africa.

All or even half of the issues raised there, such as government accountability, corruption and how to fight corruption, how to listen to the voiceless and poverty, are what make independent media possible.

That's why independent media was created.

From that perspective, what we've achieved is just a drop in the ocean of what we know today.

Well, my story is just one story after all.

There are probably 15 other great stories here about nonprofits doing great work.

Actually, I think that's the problem.

The problem is called funding

Let's say one-third of the people in this room each represent one of these foundations.

Two-thirds of people run great organizations that do very important things

Now, let's say one in two people here are deaf, and what happens when you turn off the light?

So that's how hard it is to match the person sitting on one side of the room with the person on the other side.

I thought it needed a bigger idea, an idea to reinvent and rethink funding.

Because in reality, it's like you're running around looking for your ideal partner, who has the same ambitions and goals.

I thought I should create something new instead.

So I came up with the idea of ​​issuing a bond, a bond called a Freedom of the Press Bond.

On the other hand, if there are investors who want to fund the U.S. government's budget deficit, why don't we find investors who want to fund the freedom of the press?

So, I've decided to launch a "freedom of the press" bond this fall, probably at $1,000 face value.

I'm not going to do much publicity because publicity is not important.

The important thing is that if we can get it going, if we find enough investors to call it a success, another company will start issuing bonds next spring, and there's nothing stopping us from doing that.

That bond could even become an "environmental bond."

And two weeks later, Iqbal Qadir launched an electricity business bond in Bangladesh.

And very quickly, any social problem can be funded this way.

It's like I'm daydreaming at 11:30 in the morning, but I have 55 seconds left.

But let's take this idea even further.

I'm going to start with America first, because the concept itself is very American.

You can bring it to Europe

Even in Asia it is possible

It will also be convenient for investors once they have a presence here and there.

All you have to do is put all these bonds in one place, sit down and click.

Once 10 or more bonds are released, we will develop a centralized management system.

What do investors get

It's a good thing that you can contribute to society as well as money.

You could even create a rating agency, like Morningstar.

For example the social impact of this bond: 5 stars at best

Money: 1 star because the yield is 1%

Now let's think about the final step

So when you put all these ideas together, why not create a market to sell this bond product, where you can quickly process these bonds?

If you do all your fundraising this way, there's no darkness, no blind people running around looking for each other.

thank you

Today I want to talk to you about architecture as a medium.

It's time for a second comeback of architecture that does something, not ornament and symbolism.

This is the helmet I received at the groundbreaking ceremony two years ago.

I was very happy, because I'm the only one on stage with a shining silver helmet!

I thought it was a good representation of the importance of architects.

When I got home, I was still excited.

Cannot be used as a hard hat, safety is not guaranteed." That's a very good analogy, and it's exactly what architecture and architects are doing.

Yes, we are just decorations

(Laughter) Whose fault is this?

The architects themselves are to blame, of course. Over the past 50 years, the design and construction industry has become more complex and litigated.

Besides, architects are cowards

So when we faced the issue of responsibility, we started to back off more and more. Unfortunately, where responsibility comes, power follows.

So before we knew it, we were driven into corners and corners and left behind in a place like this...

What happened? We're cowards - but we're smart cowards

I decided to redefine this corner as an architectural space.

"Architects, please come over here. Let's manage the process according to our own definition."

On top of that, I've even done painful things to the construction profession.

Yes, we have artificially divided creation and construction, as if we could say, "You can design without knowing how to build," or "You can build without knowing how to design."

We have others, too

We told the world that architecture is only the product of the skill of the man who made the best sketches.

The extraordinary effort that went into building the building over the years is not worthy of special mention.

But this is ridiculous, because half an hour of intercourse is a creative act, and nine months of pregnancy and 24 hours of childbirth are just construction work.

So what should we as architects do? Reconnect creation and construction.

Instead of creating objects, architects should create processes again.

Then we should be able to bring media and social engineering into architecture again, like we did 50 years ago.

It's true that architects have a lot to learn, like managing contracts, how to write contracts, understanding procurement procedures, and understanding money in terms of estimates and time.

But here I would like to summarize the first steps of the architect's work, albeit pedantically, in three statements.

1. Determining key issues

Surprise? How could an architect say such a thing!

2. Consensus, showing the rationale as an architect

Align with the client

From here, architects and clients can both create a vision and choose a contractor.

It is imperative that the two work together

After this, the architect presents his architectural view for the first time. You will be able to submit design drawings

Clients and architects alike have the right to criticize the drawings on the basis of their arguments.

If you follow these steps, great things will happen

"The lost art of productive management mitigation."

I can't predict where it will end up

But I promise you that if you put enough brains and enough passion into it, you'll be able to break the rules and reach whole new ground.

So I'd like to boil this down to a few quick sketches.

this is today's modus operandi

We carry a 36m Spartan (Vision) to the Trojan gates (Client)

You're worried about not being able to get through, right?

How about this: I'll bring what the Trojans want.

It's a bit of a dangerous analogy, because, as we all know, the Trojan Horse has a spear-wielding soldier.

So let's change the analogy and think of the Trojan horse as a big vehicle that you use to get through the gates (the constraints of the project).

At this stage, you and your client can start thinking about what you're going to put on the vehicle: the media function, the vision.

If you do this responsibly, you should be able to deliver a beautiful maiden instead of a Spartan soldier.

Putting this all together in one sketch, it looks like this

If we're really good at our craft, we should be able to create blueprints that can easily work through the constraints of a project or a client, right?

With that in mind, let's take a look at some projects that are important to you -- or that are close to you.

It's the new home of the Dallas Theater Center, the Dee and Charles Wiley Theater, which is opening next week.

I'll introduce it in the same terms as before.

The first issue we faced was the fact that the Dallas Theater Center has such a high level of name recognition that you would normally not think of it outside of the big three theater cities: New York, Chicago and Seattle.

Beyond enthusiasm and leadership

There was also a peculiar factor, which was actually this awful little theater itself.

How could such a terrible little theater be a factor in fame and innovation?

That's because I could do whatever I wanted in the theater.

Broadway's proscenium can't be broken

But this building, sometimes, when the artistic director wants to put people out of the well on stage when he does "The Cherry Orchard," he just digs a hole with a shovel.

I see, it's interesting

First-class artistic directors, stage directors, and actors gathered from all over the country to do things here that they couldn't do anywhere else.

So I started out by saying, "Architects shouldn't come along and build a shiny theater and take away the freedom that a dilapidated theater brings."

The next point overlaps with the first point.

The point was that this was a multi-modal theater

So, if you had the manpower, you could do anything.

It was possible as long as we had the labor force.

But I can't say that anymore, not just here, but in theaters all over the world.

All in all, it became difficult to raise operational costs and budgets.

We must let go of cheap labor

As a result, the organization was forced to freeze, and theaters were reduced to low-quality overhanging ceniums.

So we came up with the second idea: to build a theater that allows us to build the stage at will, without having to worry about running costs. It's a low budget operation.

Here's the finished blueprint, and frankly, it's a bit silly...

I took the front and back of the house off and reassembled the top and bottom.

At first glance, you're like, "Oh my gosh, that's silly. What the heck is going on?"

we created superfly

(= super cool) Super fly is a concept that applies the degree of freedom of the stage mechanism (fly tower) to the entire theater.

In no time, the artistic director can create a variety of stage and auditorium configurations.

Every part of the theater can be raised and lowered, so the rest of the environment becomes temporary, so it can be cut and opened and punched and fastened -- it can be repainted and replaced at low cost.

Unexpectedly, a third advantage emerged.

Unexpectedly, a free space appeared around the theater.

Artistic directors can use this space to immerse the audience in a fictional world.

So, at the base of this floating object, we were free to conceive of any and all possible activities.

Not only that, but in the final act of "Macbeth," for example, we're trying to create a space that reminds us of Dallas and real life, so that the fictional world of the fable blends with the real world.

To make it happen, we and the client had to go boldly.

actually thanks to the client

In response to our view, the client needed to reverse the original allocation of two-thirds of the budget to the building - one-third to the substructure, redistributing two-thirds to the substructure and one-third to the building.

It's a big challenge for clients to make this decision before they see the finished product.

However, based on our opinion, he jumped off the Kiyomizu Stage saying, "This is it!"

The machine theater was completed as a result of that effort.

This mechanical theater is so good that you can build a series of stages in a matter of minutes with just a few people on stage and the push of a button.

Also, it is possible not only to have a variety of stage styles, but also to perform multiple styles at the same time.

So the artistic director doesn't necessarily have to enter through the lobby.

I've been to various theaters, and I've found that they don't like architects. They say that in the first five minutes of a performance, there's one thing they always do, and that's to make the audience forget the building they're in.

But this theater, at the discretion of the artistic director, can also take the audience directly into the audience.

The building has a general "invitation format" -

In this building, you walk into the lobby, and whether you like it or not, you walk past this guy who's hanging out, and you go up the stairs to the auditorium.

Or you can invite them directly from outside the building, and here we invite them directly into the auditorium in a Wagnerian way of entering.

It's like this

The theater has two large revolving doors that allow the audience and actors alike to move from outside to inside and from inside to outside.

What does this mean? Honestly, due to time constraints, it hasn't happened yet.

If you can take this one step further, you'll have a lot of freedom - starting with a Wagnerian entry, Act 1 on the canopy, Greek interlude, Act 2 in the arena, Exit through the lobby with a dangle!

If you ask me, it's the performance of the building.

In other words, the architect himself took the initiative that was in his hands and handed it over to the artistic director.

I'm going to show you three basic forms.

This is the flat stage

No proscenium arches, raised balconies, no seats, flat floors in the auditorium.

The first was easy to understand.

Second form The balcony comes down The first floor seats are slanted, right? That side is the front, and the seats come in.

I think the third one is a bit confusing.

As you can see, the balcony has been removed to allow the cantilever stage.

Also, along with that, we have to change the direction and tilt of some seats.

let's take a look again

side balcony for proscenium

And this is the state of the overhang stage

What made this possible was the client's willingness to spend on education.

I received one important request, "Please don't do beta testing."

So, don't do anything that hasn't been validated elsewhere.

But they said that if the technology was proven and foolproof, it could be applied to this theater.

So we adopted scoreboard lift technology as a solution for balconies.

You don't want to drop the scoreboard on dirt or whiskey.

If you can't get the scoreboard out of the arena and you can't do the ice show the next night, you're in trouble again.

With this technology, which has already been proven safe, it should be possible to freely change the stage configuration, and both the theater and the client decided to adopt it with confidence.

The second application in this theater was the technology used in the wings of the opera house.

By applying that technology, we lifted the floor of the first floor, rotated it, changed its inclination, turned it into a flat stage, and then inclined it again.

You can see how the seats swivel and the proscenium and the end stage become the overhanging stage.

As far as we know, this is the first building in the world to completely eliminate the proscenium arch from the space.

Above the audience you can see various acoustic baffles - hangings and catwalks.

And inside the Flytower, there's a stage set that creates each scene.

As I said, these allow for flexible and affordable configuration.

And there's another advantage here: the neighborhood of the theater and Dallas quickly became intertwined.

The awning is closed. It's like a trompe l'oeil

Actually, it's not a curtain, it's a vinyl blind -- it's built into the window itself, which is also a safety-tested device.

At the same time, you can show the audience the city of Dallas or use it as a backdrop.

So let's take a look -- let's start with some early concept sketches -- and put together all of the things we've talked about so far.

I think it will be something like this

Actors, props, props can be brought in directly Elephants can be put in "AIDA"

We expose the inside of the stadium to the city of Dallas, and vice versa, we expose the city of Dallas to the eyes of the audience.

By opening a part, it is possible to change the progress and enter and leave the curtain before the performance or after the performance.

And the balcony can not only be moved, but it can be completely hidden from view.

The proscenium arch is hoisted

Large objects can be transported directly

But what was most compelling in getting us to rethink the budget was the potential that this slide showed.

Of course, the flexibility of the building is not limited to this, but I think it at least conveys the atmosphere.

This building can be quickly converted into a flat platform that can be rented as an event venue.

If anyone from American Airlines is here, please host a Christmas party here.

(Laughter) If we could rent this place out as an event venue, we wouldn't have to compete with larger venues for operational costs.

The benefits are immeasurable

That's why the theater company can play Shakespeare intimately, with all the light and sound at its fingertips, with great acoustics, and at the same time, Beckett against the backdrop of the Dallas skyline.

This is what I set as a flat stage

I'm in the middle of a trial run right now.

Here is the end stage setup

It's beautiful. A rock band is coming.

I checked the acoustics from outside.

It felt very strange

And setting up the overhang stage

And finally, it's all about setting up as a venue, getting an operating budget and overcoming the company's number one pain point, and that's exactly what a building can do.

Let's take a quick look at the work progress

As I said, it can be done in a short time with just two people's efforts.

This was the first time we had a test run, so we're literally overwhelmed by thousands of people who are so excited to participate.

So ignore the swarms of ants that move about

Keep in mind that a few people are actually enough

I repeat, only a few people can do it.

(Laughter) It's true.

And voila!

(Applause) So to summarize, I'm going to show you a couple of slides.

The Dee and Charles Wiley Theater at the AT&amp;T Performing Arts Center

this is how it looks at night

And the whole picture of AT&amp;T Performing Arts Center

Winspear Opera House on your right, Dee and Charles Wiley Theater on your left.

I want you to remember that this is an example of a building that has done something.

We vaguely got here through a series of problems that the company and the client were facing.

Together we came to a consensus, and from that we developed an architectural vision that led to a blueprint that was initially unimaginable—and unimaginable on our own.

Thank you for your attention

(Applause)

good morning namaste

i am very happy to be in india

I've been thinking about what I've learned in the last 11 years, through V-Day and "Vagina Monologues," I traveled the world to meet women and stop violence against women.

What I want to talk to you about today is that we all have certain or group cells.

I would like to call it a female cell

it is also present in men

Imagine that this particular group of cells is the linchpin of human evolution -- and of human survival.

Throughout history, those in power who were dedicated to dominating and occupying the world began the process of subduing, suppressing, weakening, reinterpreting, and making us believe in the shortcomings of this cell, diminishing it, destroying it, crushing it, eradicating it, and annihilating it, resulting in a patriarchal society.

Think of girls as chips in the collective consciousness system.

It is essential for harmony and wisdom - and for our future.

Female cells are compassionate, sympathetic, and passionate.

How does kindness affect wisdom? Sensitivity is its greatest virtue -- it's radical, it's appropriate, it leads to action parsimony -- there's an innate logic in emotions.

However, have we not been taught – as if the opposite? Kindness dulls thoughts - hinders them Sensitivity is weakness Emotions are untrustworthy - don't take things private Now is my favourite.

I think the whole world was brought up not to be a girl?

What does "becoming a boy" mean?

"To be a boy" means "not to be a girl"

Be a man = don't be a woman

Be a woman = don't be a girl

To be strong = not to be a girl

Be a leader = don't be a girl

In fact, being a girl is very powerful, because we've all been taught not to.

(Applause) Ironically, it's the denial, the suppression, the suppression and rejection of "girls" that has brought us to where we are today.

Unseen poverty, genocide and mass rape - on this out-of-control, crumbling planet where extreme forms of violence are rampant - have been forced to live.

I can't feel what's going on because I've suppressed my female cells and suppressed my "femininity".

Yes, we haven't been given enough responsiveness to what's happening.

A Turning Point in My Life - About the Democratic Republic of the Congo

I would like to talk to you for a moment

12 years so far

In a world where violence and rape are rampant, you thought you'd seen a lot.

The last three years I spent in the Congo

It was a turning point in my soul.

At Pansy Hospital in Bukavu City, Dr. Mukwage, who deserves to be called a saint more than anyone I've ever met.

spent time together

The Congo has been at war for 12 years and has killed 6 million people.

And an estimated 400,000 women have been raped.

My first week at Pansy Hospital, spent with women queuing up to tell me what happened to them.

Their stories were so unbelievable that the frightening side of humanity honestly broke my spirit.

I'm going to tell you what happened: Eight-year-old girls were disemboweled, and guns, knives, and things like that were stuffed into their bodies, literally piercing holes through which urine and faeces flowed out.

An 80-year-old woman who was bound in chains, surrounded by multiple men, and raped intermittently, all in the name of economic exploitation.

my heart is shattered

But it's the shattering that lifts me up - it's encouraged me in a way I've never felt before

Being shattered allowed my female cells to blossom and break through the walls of my heart to be braver, stronger and smarter than I ever was.

I think the people in power know that emotions are what lead to the expansion of power and the exploitation of the earth's resources.

that it prevents vandalism

For example, my father, he was very violent and was often beaten.

When he hits me, he always says, "Don't cry, I don't care if you cry."

As if my tears reveal my ferocity

I didn't want to be made aware of what I was doing, not even for a moment.

We intentionally destroyed the female cells.

Not only men, but also female cells within women

And somewhere along the line, we've dealt with the destruction of a man's female cells -- much harsher.

(Applause) All over the world, I've seen how boys are raised to be strong, to be ruthless, to keep them away from their own kindness, to keep them from crying.

In Kosovo, I've learned that when you see a man collapsing, a bullet clots your tears -- not giving them the sensibility that's part of being a "girl" makes them ruthless, more dangerous, more violent.

All this time we've taught men to be confident when they're not confident, to pretend they understand when they don't, or else we wouldn't have gotten this far.

Haven't we taught you to pretend you're not in need?

One funny story here

I was walking up and down the aisle on the plane here

There were at least a dozen men sitting in tiny seats watching nothing but romantic movies.

I thought, "This is the true identity of the hidden man."

(Laughter) As I said before, I've been around the world and seen a lot of what happens to "real" girls when it comes to treating female cells. It's scary to even imagine

You also heard from Sunita and Kavita yesterday what was going on?

I've met girls who have been treated badly, covered in cuts and cigarette burns - girls literally turned into ashtrays.

treated like trash

From Parents and Siblings to Relatives: Girls Subjected to Violence

In American facilities, girls starve themselves to death for their "ideal body shape"

Mutilating and manipulating female genitals - leaving them illiterate to being too intelligent -

Guilt and silence Told me to behave Told me to keep my emotions in check

Sell ​​off, abort – dominate, rape

I'm used to taking away the identities of girls who want to be subjects in their lives, and now I've actually made them objectify -- they've turned them into commodities.

Human trafficking spreads all over the world

In many cases they are sold for less than livestock.

But given the fact that one in eight of the world's population is a girl between the ages of 10 and 24, they are the key to the future of the entire world, including the developing world, and of humanity.

They are in trouble because the systemic conditions, including lack of access to education, nutritious food and medical services, and forced participation in manual labour, push them into the position society wants them to be.

To avoid crossing that line, the burden of household chores is usually placed on girls or younger family members.

I believe that a girl's environment and circumstances -- the inner "girl" and the outer "girl" -- will determine the survival of the human race.

By talking to girls, I've written a book called "I'm an Emotional Ikimono: The Story of a Hidden Girl." I've been talking to girls for five years, and there's one word that's always forced upon them: the word service.

girls are trained to serve

i want to change this word

Let's all say this word-

Change "active" and "immersed" in "education" into "fighting", "resistance" and "creation".

If we teach them to change this word, we can protect the "girl" in us.

I'd like to share some stories of girls I've met around the world who believed in—and embraced—the girl in themselves despite the harsh circumstances around them.

A 14-year-old Dutch girl is about to travel the world alone on a boat.

A teenage girl with 56 stars tattooed on the right half of her face

A girl named Julia lived in a tree for a year to protect the natural oak tree.

A girl I met 14 years ago in Afghanistan had her revolutionary mother killed and I adopted her.

When I was 17, I hid a camera under my burqa, and I went undercover in Afghanistan, where people were committing atrocities against women, and with a camera hidden under my burqa, I recorded what happened.

That video went around the world after 9/11, showing the world what was going on inside Afghanistan.

A little bit about Rachel Corrie, who risked her life to stop the Israeli occupation.

I stood in front of a military bulldozer and was killed.

A girl I met recently in Bukau was impregnated by rape.

to her holding a baby

can you love that baby when I hear

Looking into baby's eyes, "Of course my baby in love How can I not love you?"

I said

I can't imagine the power a girl has to overcome difficulties.

met in kenya

Dorcas, 15, is trained in self-defense.

A few months ago, she was kidnapped on the side of the road by three men who forced her into a car.

But as per her training, she

I grabbed him by the throat, stuck him in the eye, and ran out of the car.

In August, I visited a V-Day safehouse in Kenya that I built seven years ago with a woman named Agnes.

Agnes was genital mutilated when she was a young girl.

Like many women, she decided that the same thing shouldn't be done to other women and girls.

How many years have passed since then, across Kenya from north to south

I went around teaching girls what a natural vagina looked like - what a broken vagina looked like.

A lot of girls have been saved. When I met her, I asked her what we could do, and she said, "If you could give me a car, I could get around faster."

Equipped with a car, she saved 4,500 girls.

When asked, "What else can I do?"

'Now I need a house'

We built the first V-Day safe house in a town called Narok in Masai land.

It's a place where girls can take refuge -- protect their clits -- and go to school.

Within a few years of building the house, she changed the landscape of the area.

She became a deputy mayor of the city

amended the rules

The whole community embraced her initiative

When we visited, she was arranging reconciliation between a runaway girl and her family.

14-year-old Jacqueline Maasai

There was a girl in Kenya, where the drought was going on.

The cattle, our most valuable possession, were dying.

Jacqueline overheard her father and an old man trying to sell her for a cow.

it can't even go to school

genital mutilation, no future

must be a man's wife

i knew it meant

And then one day she heard about the safe house, and she ran out and walked the Masai for two days, "two days."

Spend the night with hyenas to hide—

Despite the fear of being caught and killed by my father, I walked with the hope that Agnes would meet me at the house.

Arriving at the house she was greeted

Agnes accepted her and gave her love, and Jacqueline received support for a year.

I went to school, found what I should do, found myself, and found my heart.

So after a year, she was ready to go home and talk to her father about reconciliation.

I had the privilege of being present when she was reunited with her father and reconciled.

And when I entered the house, my father and his four wives were sitting there, and the sisters who had left home after her had also returned, and they had been beaten to protect her -- her mother.

And when the father saw his daughter transformed into a woman, he hugged her and broke down in tears and said,

"You've grown into a beautiful grown woman—

I won't cut it off-

I swear I'll cut off your sister too."

She said - "You tried to sell me for four cows and a calf - and a few blankets.

But don't worry, I'm going to get an education - I'll take care of you all the time. When I come back, I'll build your dad's house.

And how long will you stay by your father's side?"

This is the power of "girls"

This is the power of "growth"

I would like to end with a passage from the book -

For all the girls here - for Sunita -

and sunita was talking

Read for girls who may survive and live their dreams

And I want to read it for each and every one of you here, because I want you to know the importance of the inner girl, and I want you to treasure the part of us that sheds tears -- the emotional part -- the vulnerable part, and understand that it determines our future.

This work says "I am an emotional ikimono"-

It all started with a girl I met in Watts, Los Angeles

Are you satisfied with girls? When I was asking the question, everybody said, 'I don't like it, I can't--

Everything is occupied by younger brothers and older brothers.”

But one girl-

"Aren't girls the best? They're emotional creatures!"

(Laughter) Dedicated to her Girls are the best!

What you're feeling - I can feel it inside

Emotional life!

Reasons and theories - you can't understand with a narrow way of thinking

I can feel it pulsating from my organs to my feet and my ears getting hot

I know when your girlfriend is in a bad mood, even if she pretends not to be

A storm is coming! do you know

I feel the fluctuation of the invisible air

If he doesn't call me, I'll find out if I share the "space"

Emotional life!

It's best not to take things lightly-

Everything has a fever to me When I walk down the street When mama wakes me up in the morning I can't bear to lose! News is not for everyone!

Because it's emotional life!

Everything and everyone are connected! You were born that way!

I can't let you judge me negatively and say that I'm young or that I'm a girl!

this feeling makes me better

It makes me feel alive, prepares me and makes me stronger

I'm an emotional bitch!

For some reason, older women forget

A special way of understanding things—

It's still inside me!

I know when the nuts fall

we tormented the earth too much

I know my father won't be back - no one is prepared for the shortage.

The fact that lipstick is no show, the fact that men's self-confidence has completely disappeared, and the so-called terrorists are created instead of being born.

I know that one kiss can take my judgment to zero

(Laughter) I think sometimes it should be

It's not extreme, girl power This is what we all do when the door inside us opens

Don't let me say "Keep calm, don't get hot - don't cry"

I'm an emotional animal!

Just like the earth was created, just like the wind carries life—

You wouldn't say to the stormy sea, "Be careful," right?

I'm emotional!

Why are you trying to silence me and smother me?

i'm a remnant of your memory

i could take you back

It's not fading

It's not even spilling out of the gap

listen! Even if my life is stopped Even if my heart is hurt Even if I'm thrown out of the place To be able to feel your hidden feelings It gives me a sense of responsibility That's what I love

I'm emotional and gratuitous - I'm a devoted bitch!

listen! Girls are really great!

say it to everyone

Girls are really, really great! !

thank you

(applause)

Please close your eyes and spread your palms

Imagine what you could put in your hand, an apple or a wallet.

open your eyes

Did you think of one life?

this is a premature baby

He seems to be sleeping peacefully, but in reality he's desperately trying to survive, and he can't regulate his own body temperature.

Because they're too small, they don't have enough fat to keep them warm.

Sadly, 20 million such children are born each year in the world.

4 million people will die

And to make matters worse, they survive and grow up with serious, long-term health problems.

In the first month of life, a baby's only job is to grow.

If you have to contend with hypothermia, your organs can't grow normally, leading to a variety of health problems like diabetes, heart disease, and low intelligence.

Simply keeping them warm can prevent many such problems.

I have an incubator for that

But traditional incubators require electricity and cost $20,000.

That's why you don't see incubators very often in remote areas of the developing world.

So they try to make do with what's available, like putting a hot water bottle around the baby or putting the baby under a light bulb, both of which are less effective and less safe.

I've seen things like this many times

When I first went to India, I met a young woman named Sevita, who had just given birth to a small premature baby, Lanny.

I took the baby to a nearby village clinic, and they told me to take him to a town hospital that had an incubator.

But the hospital was over four hours away, there was no way to get to Sevita, and the baby died.

After hearing dozens of stories about this story and others like it, I realized that we needed a simple solution that didn't require any electricity, and could be used by mothers and midwives, because the vast majority of pregnant women are still giving birth at home.

Something you can take with you, sterilize and reuse for multiple babies, for a lot less than $20,000 for an American incubator.

and this is what I created

Doesn't look like an incubator

It's like a little sleeping bag for babies.

It's all unfoldable and waterproof.

No internal seams for easy sterilization

The main point is in this pack containing the phase change heat storage material.

A wax-like substance with a melting point of 37 degrees, the same as human body temperature

If you put it in hot water and melt it, it will keep a constant temperature for four to six hours, and if you heat it up again, you can use it again and again.

You put this in your back pocket and you have a little warm environment for your baby.

It's very simple, but it's the product of dozens of iterations of going out there and talking to doctors and mothers to make sure it's really meeting the needs of the local population.

We're planning to roll out this product in India in 2010, and we're targeting a price of $25, which is 0.1 percent of the price of a traditional incubator.

Our goal is to save the lives of one million babies in the next five years.

But in the long run, this will limit population growth.

It may seem counterintuitive, but the fact is that lower infant mortality rates lead to lower populations, because parents don't have to assume that their babies will die.

I hope that simple ideas like this Embrace baby warmer are the way technology is heading in the future -- simple, affordable solutions that are right there and have the potential to make a big impact on society.

In designing, we followed some basic principles.

I tried to really understand the end users, people like Sevita.

I tried to understand the essence of the problem without being bound by what was already there.

And I figured out the simplest way to solve this problem.

I think that's how we can really bring technology to a wider audience.

The warmth of this Embrace can save millions of lives.

Let's say you're standing on the street in America, and a Japanese guy comes up and asks you, "Excuse me, what's the name of this block?"

"What? Oh this is Oak Street and that is Elm Street

This is 26th Street and over there is 27th Street."

"So what's the name of this lot?"

"There are no names for parcels.

The names are on the roads, and the unnamed sections between the roads are the parcels."

he will walk away with a confused head and a disappointment

Now let's say you're standing on a road somewhere in Japan and ask someone nearby, "Excuse me, what is the name of this road?"

"Yes, number 17 is over there and number 16 is over here."

"I'd like to know the name of this road instead."

"There is no street name

the name is on the parcel

Look at Google Maps, this is number 14, 15, 16, 17, 18, 19.

Every lot has a name. The unnamed part between the lots is the road."

"How do you know the address of the house then?"

"It's easy, this is 8-chome, isn't it?

It's house number 1 at number 17."

"I walked around a bit, but the house numbers weren't in order."

"That's right, they are numbered in the order in which they were built.

The first house built on this lot will be #1

No. 2 was built second.

3rd house is number 3 It's easy It's obvious, right? ”

That's why I like to visit the other side of the world from time to time, because it reminds us that our unconscious assumptions can be true, and vice versa.

Chinese doctors, for example, are considered to have a job to keep people healthy.

So if you're healthy, you pay the doctor.If you're sick, you don't get paid.Doctors make money on their health, not their illness.

(Applause) We use '1' in music at the beginning of downbeat music, 1 - 2 - 3 - 4.

But in West African music, the "1" is the end of a phrase, like a period at the end of a sentence.

Listen as breaks, not in phrases. 2 - 3 - 4 - 1

And this is also an accurate map.

(Laughter) There's a saying in India, "The opposite of whatever is right is also right."

So when you hear a great idea at TED or anywhere else, just remember that the opposite might be true as well.

Domo Arigato Gozaimashita

If you're a researcher, you'll run into something from time to time that's a little disconcerting.

This is something that will change your understanding of the world around you, something that will tell you that you were totally wrong about something you believed so firmly in.

These are unfortunate moments, because it means that you will go to bed more ignorant that night than when you woke up in the morning.

Now, the purpose of my story is to A tell you when that will happen B when you leave than when you came here.

It's a little bit of ignorance, and I really hope that's achievable.

And what I'm about to explain starts with diarrhea.

We have long known the causes of diarrhea

There's a glass of water over there and that's the reason

for us in this room

It's just a problem, but for babies it's deadly.

Babies don't get enough nutrition, and diarrhea causes dehydration.

As a result there are many deaths there are many deaths

In India in 1960, the child mortality rate was 24 percent, and many people, incredibly unfortunately, did not realize this.

One of the big reasons this happened was diarrhea.

Now there's a lot of effort going into solving this problem, and there was actually a solution that worked.

It was called by some, "perhaps the most important medical breakthrough of the century."

This solution turns out to be simple

oral rehydration salts, many of you

you may have used this

Adding it to water is a great way to get sodium and glucose together, even during diarrhea symptoms.

Children can absorb it, which has a noticeable effect on mortality.

It's a powerful solution to this problem.

To skip to the point, in 1960, the child mortality rate was 24 percent, and it's gone down to 6.5 percent today.

It's still a high number, but it's a big decrease.

At first glance, the technical problem seems to have been resolved.

But did you know that India alone still has about 400,000 diarrhea-related deaths?

What's going on?

The short answer is that we didn't provide salt to these people.

these are not actually true

If you survey the areas where salt is available, you'll find that these deaths will continue to decline because the price of salt is cheap or free.

there may be a biological answer

Maybe these things don't go away with simple hydration.

This is also not true, because many diarrhea-related deaths are completely preventable, and it's really disconcerting.

As you know, we've all worked in many fields, technically, scientifically, through hard work, through creativity, through human genius, to technically solve society's important problems.

Over the course of 2000 years, there have been discoveries, and they're human progress.

But while we've found a solution, there's still a large part of the problem.

999 miles went well The last mile is so nasty

This was about oral rehydration, maybe.

Maybe it's just diarrhea

But it turns out that there are many, many, many of these really baffling last-mile problems, and it's not just diarrhea.

It's not even limited to the poor in India.

Here are examples of different situations

Here are some examples

It's insulin, which is used to treat diabetes in the United States.

For Americans, it's medical assistance for the poor.

For those on Medicaid and those with health insurance

Insulin is commonly used [even in pills (wrong)] You can get insulin treatment by injection Daily injections to maintain blood sugar levels

A major technological breakthrough has caused a terrible and deadly disease

It's treatable. Now the adherence rate, how many people

Are you injecting insulin every day? About 75% of people inject insulin daily

As a result, 25,000 people go blind a year, and hundreds of thousands of people lose their legs every year, even though it could be fixed.

Here are a bunch of other examples, all plagued with the last mile problem.

More than just medicine

Here's another example from technology, agriculture, and we think we have a food problem.

So we develop new varieties We think we have a revenue problem So we increase revenue

create new farming methods, now the measures taken in the past

Let's see how intercropping increased revenue

Mixing different varieties can dramatically improve rice production.

Some people did this, but many people didn't. What's going on?

this is the last mile

the last mile is everywhere

It's a hard one to solve. So what's the problem?

The problem is behind these eyes, the 1.4 kg machine (the brain) between the ears.

This machine is really weird, and people are weird as a result.

they do many contradictory things

(Applause) They do a lot of contradictory things.

And the contradiction creates this last mile problem.

what we have in biology, bacteria, genes, this

When it comes to blood, it's complicated.

You can control

mind is more complicated

control is not working

This is where we struggle.

There's one question asked in the National Sample Survey, where we interviewed a number of women in India, saying, "Your child has diarrhoea.

Do you increase your hydration?

Would you like to change it? Or do you want to reduce it? Before giving embarrassing answers, let me tell you the correct answer.

Diarrhea is interesting because for thousands of years humans have actually been living side by side, polluting the water.

One Roman strategy, which is very interesting, and which actually works quite well, was that they told their soldiers not to drink the water if it was even slightly cloudy.

If your army gets diarrhea on the battlefield, you can't fight effectively.

Chest armor, armor was part of a very good Roman strategy, but drinking clean water might also be considered a strategy.

Here are women from India who have seen their parents fight diarrhea, they have seen many deaths.

How would an Indian woman respond? 35% to 50% of Indians said they would reduce

think about this for a moment

Between 35% and 50% of women forget their oral rehydration treatment, and a growing number of them actually nearly kill their children by their own actions.

How could this happen?

Now, one possibility is that many people might say, "It's because I'm not intelligent."

i don't think i'm low intelligence

I think there's a deeper reason for these women's actions.

That means don't put water in a leaky bucket.

Think about the psychology behind drinking less water.

just doesn't make sense

The model makes intuitive sense

It just so happens that in the real world it doesn't make sense.

It makes sense on some deep level

So it seems to me that it's a fundamental challenge to the last mile problem, and this first challenge is.

what I call a challenge to persuasion

Persuading people to do something is different than giving them information, like oral rehydration or intercropping.

I will act appropriately." Things are more complicated.

And if you want to understand how complicated it all is, let's start something fun with me.

I'm going to give you a little math problem, get your answers out loud as soon as you can.

The bat and ball together cost $1.10

A bat costs a dollar more than a ball

What is the price of the ball? quickly

some say 5 cents

most people say 10 cents

Let's take a moment to think about 10 cent's answer

If the ball is 10 cents, the bat is...

It's easy, one dollar and ten cents.

Together, it's 1 dollar and 20 cents.

You are apparently educated people.

you are so clever

What this combination tells us is that you're actually going to give the wrong answer.

How could that happen?

Let's do something different. Algebra is complicated.

So go back in time, 5th grade? 4th grade?

Let's go back to kindergarten, okay?

there are great shows to watch

It's a show called "Are you smarter than a 5th grader?"

i think the answer is here

Let's go back to kindergarten Let's see if we can beat the 5 year olds

here i do something

I make the shape appear on the screen Say the color of the thing

that's all ok

Say the answer quickly and loudly with me instantly let's start with the easy stuff

May I? black

Say the following quickly and out loud

May I? start

Audience: Red Green

yellow blue red

(Laughter) Sendhir Murraynathan: Very nice.

Almost finished kindergarten

What does this tell us?

You see, what's going on here, and also in the bat-and-ball problem, is that you have an intuitive way of being driven by a certain reality, a model that you use to make sense of the world.

These models, like the leaky bucket, work well in many situations.

I hope that most of you are right, and the rest of you are right, and I actually think that addition and subtraction can be done very well in the real world.

Some of the problems I've found are easy to get wrong.

Diarrhea and many "last mile problems" are like that.

Diarrhea, and many of the "last mile problems," are those kinds of situations where psychological models don't match reality.

It's the same thing here, and you have an intuitive reaction to this answer.

They were instant, I read the word "blue" and tried to say blue.

The answer was red, but I thought this little thing was interesting.

but it's even more meaningful

how they actually affect

Let me give you a good example: BMW is a very safe car.

"A safe car is great

I want to advertise as a safe car How can I advertise as a safe car? I think

"If you can show it in numbers, you can get a good score in the crash test."

But the truth is that when you look at the car, it doesn't look like a Volvo, and it doesn't look like a Hummer.

Think about it for a few minutes How would you tell your BMW to be safe Okay?

Now, while you're thinking about that, let's move on to the next task.

The next issue is good fuel efficiency.

here is another problem

Somebody goes to a dealer showroom and they think about buying a Toyota Yaris.

They say, "Buy a Prius that runs 50 miles on a gallon because it's eco-friendly and runs 35 miles on a gallon."

Others walk into the showroom, they're buying a Hummer, it's a gallon, it runs nine miles, it's luxury with all the options.

They say, "Do I have a turbo? Do I need this heavyweight car?"

"Because it is environmentally friendly

Get rid of the weight-adding stuff and I'll buy a Hummer that runs 11 miles on a gallon."

Which people are doing better for the environment?

yes you have a mental model

50 to 35 is a big difference. What about 11 to 9?

The answer is, do the math when you get home. 9 to 11 is the bigger change. This person saves more gallons.

Because it's the gallons per mile that matter, not the miles you can drive with one gallon.

If you're looking to improve fuel efficiency, think about how profitable it is.

miles per gallon is the way it is now

If you want to change behavior, gallons per mile are more effective.

Such peculiar cases have been studied

Back to BMW What should I do?

The problem facing BMW is that this car looks safe.

This is my Mini, but it doesn't look very safe.

Here are some great insights from BMW that they put into their advertising campaigns.

They showed me a BMW driving down the road

There's a truck on your right, and the load falls off the truck.

The car quickly avoids it and does not cause an accident.

BMW knows that safety has two components

to be safe in a collision and to be safe in avoiding accidents

It's a remarkably successful campaign. Let's take a look at its power.

use what you already believe

Even when I persuade people to do something, it's sometimes difficult to get them to actually do something.

You try to wake up at 6:30 or 7:00 a.m.

This is the battle we fight every day, just like trying to get to the gym

This is an example of that battle, and it makes us realize that determination doesn't always translate into action, and one of the fundamental challenges is how we do it, okay?

Let's talk about the last mile problem

So far I've been very pessimistic

I've been trying to show that human behavior is strange.

maybe too pessimistic

The same can be said for diarrhea.

Maybe the "last mile problem" should really be considered a "last mile opportunity."

Let's go back to diabetes

This is a typical insulin injection story.

It's a hassle to carry around

you carry a vial and you carry a syringe

it's also painful

You might think, "Oh, if my eyes need it, of course I use it every day."

But it's painful, it's uncomfortable, and when you're on a long journey, even if you're careful and remember to put it in your band bag, it's still going to be a problem in your day-to-day life.

there is innovation there is innovation in design

This is a pen, it's called an insulin pen, and the medication is in a cartridge.

Needles are especially sharp

just bring this

Easier to use and less painful

5% to 10% more people adhere to treatment because of this pen

This is why I say "the last mile opportunity"

As you can see, we tend to think that when a technical problem is solved, the problem is solved.

But human innovation, human problems still remain, and that's the big frontier we're left with.

This isn't biology about people, it's about human psychology about the brain, and innovation is needed until the last mile.

here is another example

Here is an example of a company named Positive Energy

This is about energy efficiency

We're working hard on fuel cells right now.

What this company does is send a letter to each household saying, "Here's your energy usage. Here's your neighbor's energy usage."

You are making good use of it.” Smiling expression “You are not making good use of it.”

All they found was this letter, which reduced electricity usage by 2% to 3%.

You might want to think about the social value of saving $900 million a year in electricity in terms of carbon offsets.

I wonder why? Because it's free. This isn't new technology. It's the letter. It's the big bang of action.

How will we face the last mile?

this tells us we have a chance

I have to combine psychology, marketing and the arts, as we've seen, to tackle it.

What should I combine these with?

it needs to be combined with the scientific method

For me the really baffling and frustrating thing about the last mile is that the first mile to 999 is about science.

No one will say, "I think this medicine will work, let's try it."

Test, research, test again, improve

But what about the last mile

"Good idea, people are going to love this, let's use it."

The amount of money we spend is completely out of proportion.

We're putting billions of dollars into fuel-efficient technology.

How much are we investing in changing the way we use energy, in a credible, systematic and experimental way?

I believe that we are now on the brink of something big.

We are on the brink of a whole new social science.

Social science recognizes the complexity of the mind, just as science recognizes the complexity of the body, just as biology recognizes the complexity of the body, it becomes aware of the complexity of the human mind.

Careful inspection, reinspection, and design will open up perspectives on understanding, complexity, and conundrum.

And these prospects will give rise to new science in the next 100 years that will fundamentally change the world we live in.

Thank you very much

(Applause) Chris Anderson: Thank you, Sendir.

All these fields are very attractive

Now and then, when I talk to behavioral economists, they seem to academically codify certain long-standing intuitions that great marketers have.

Is your field working to bring together the insights of great marketers into psychology?

their insights are from the field

Sendhir: Yes, I've spent a lot of time talking to marketing people, and 60% of the time, you should be talking about what you're talking about, gathering insights.

40% is what marketing is

Marketing is selling advertising to businesses

So in a way, a lot of marketing is about convincing the CEO that this is a good advertising campaign.

Sometimes things don't go as planned

A word of warning, it's not the same as actually running an effective advertising campaign.

And one new movement in marketing is the topic of measuring effectiveness and whether it works.

Chris: How do you take your insights there and actually integrate them into your business model? For example, in a village in India

SM: The scientific method I showed is very important

I work closely with operationally capable businesses or non-profit organizations

"If you want to change this behavior

We come up with a few ideas, we test them, we go back and integrate them to see which ones work, and we try things that actually work, and then we're able to scale with our partners.

It's a model that worked in other situations

If it's a biological problem, we try, we solve it, we see if it works, we scale it.

Chris: Okay, thank you so much for coming Ted.

(applause)

My brother called me in December of 1998, and he said it wasn't very good news.

That's my brother on this screen.

It was right around the time I was diagnosed with ALS, a disease with a life expectancy of three years.

Motor neurons in the spinal cord fail and the body becomes paralyzed.

That's why a healthy, strong, 29-year-old man can't breathe, move, or speak on his own.

This was a break for me - I embarked on a journey with my brother to learn a new perspective on life.

Stephen passed away three years ago, but we had a wonderful trip as a family.

We don't even think of it as a "disaster" anymore.

We had a tremendously positive conversation about what was happening and what to do about it.

What I want to talk to you about today is one of our efforts, a new way of thinking about how we approach healthcare.

Because, as we all know, it's not working as it should.

I would like to relate this to the story.

this is my brother's story

But what I want to tell is not that story, but a higher story beyond that.

“All things considered, what is the best possible outcome for me right now – and how do I get there?”

This is what we're trying to do in medicine, and what everyone should be doing.

This question contains many variables

Each of us has a different position and situation.

Everyone has their own hopes, dreams, and what they want to achieve. Their future paths are also their own, and each one is a story.

But it doesn't get much more than a story until you turn it into data.

From walking and breathing, to hands and speech, and finally to well-being and functioning.

The first medical condition is represented by a stick figure on his icon, but what's really important here is the non-medical part.

When Steven was in that pool, he was paralyzed, he couldn't walk, he couldn't move his arms, he was wearing a little float, did you see that? Despite this, he seemed happy. When we went to the beach, my brother was raising his son and he was able to do many things.

I collected this information and turned it into data.

But it's not just a data point at that point in time.

Here's Steven's data point in the chain.

Here's a picture of me in the pool.

This is a picture of me walking down the aisle. I'm weak and can barely walk.

I could hold my wife's hand, but I couldn't button my clothes, and I couldn't feed myself.

In this picture, I'm completely paralyzed. I couldn't breathe or move at this time.

These stories of his life were converted into data.

Stephen even won an award for restoring a historic building when he was completely paralyzed and couldn't speak or breathe.

Here Stephen shares his story with the world.

It was at this point that I had an exciting prospect: in a time when human relationships are becoming tense, people want to love and care for each other.

It is only by giving to others that you will also succeed.

So Stephen shares his story, but he's not the only one.

many others share their stories

It's not just words, it's telling stories with both data and words.

And then we turn that information into structure, knowledge, transforming stories into something computable, information that can influence how medicine is delivered.

We've applied this to ALS, depression, Parkinson's, and it's also applicable to HIV.

Because it's not available on the Internet, it takes thought and process to find meaningful information about difficult diseases.

Now the website looks like this

Let me show you "Patients Like Me," a company founded by me, my youngest brother, and my best friend from MIT.

Here are real patients, about 45,000 right now, sharing their stories as data.

This is Mike, a multiple sclerosis patient

Cognition, vision, locomotion, and sensation all deteriorated uniformly.

These are individual differences in people with multiple sclerosis.

Each person may have different characteristics

Fibromyalgia, HIV, ALS, depression, etc.

This is an HIV patient named Ginny.

It's been two years since the onset of symptoms.

He keeps his CD4 count down and his viral levels down to make life easier.

Collecting this information will give us information about treatment.

Look, about 2,000 people are using Copaxon.

These are the people who are currently taking the drug and are sharing the data.

I like gymnastics and prayer

Anyone interested in researching the relative effectiveness of "prayers"?

Let's take a look at the prayers.

this is why people pray

This is the frequency of your prayers - the dosage.

Let's see if these 32 patients who pray for 60 minutes a day are getting better.

It's an open network where everyone shares information and anyone can see it.

Let's Look at Anxiety People pray to have things to worry about.

This is the current anxiety data for 15,000 patients.

How they're coping, the drugs they've taken, their breakdowns, their side effects, it's all displayed in an easy-to-read display, and you can drill down to see individual information.

And thanks to this amazing data, you can drill down and see what this drug does. 1,500 people are using this drug.

I'd love to hear from these 58 patients -- they're taking 4 milligrams daily.

Above all, I would like to hear from people who have used the drug for more than 2 years.

You can also see the period

It's all public, it's all accessible

log in

this is my brother's profile

This is a new platform that we are launching right now.

2nd generation made with flash

If you hover your mouse over it, you'll see Steven's data displayed against the background of the other patient's data so you can see and compare them.

Blue is the 50th percentile, and my brother is the 75th percentile, and he has non-genetic ALS.

If you scroll through your profile screen, you'll be able to see all of your prescriptions, and in the newer version, you'll be able to see this interactively.

Please wait, degraded spinal capacity

Sounds like a good stock program, right?

Isn't it great that health care technology is as good as money making technology?

Detrol's list of side effects for his medications includes stem cell transplantation, and it's the first time anywhere in the world that anyone can see it freely like this.

It's amazing, it's the only place where cyberkinetic implant patient data is available online.

You can also adjust the time scale and the symptoms.

See how your ALS treatments are working

Click on the ALS tab

I'm on three different medications, some experimental.

I will look at the condition of constipation and see how to treat it.

There's magnesium citrate, and the side effects of that drug are written into a timeline in a meaningful way.

but i want more

It's not enough to just look at excellent functions. I want to make good use of this data.

With my brother at the center of the universe, I want to create a galaxy of data that encompasses all of his symptoms, medications, all the elements that interact with him, side effects, and I want to slice and scrutinize all of this information.

I don't really know what

I want to solve a problem I want an application for that

I want to rearrange the data I've got myself, I want to put the symptoms on the left and the drugs on the top, and I want to know what's working with all of Steven's and everyone else's information.

Years later, when my brother was on these drugs, I learned that everything he'd done to reduce salivary overproduction, including drugs that had positive side effects, was making his constipation worse.

Anyone who's ever had a bad case of constipation knows how much constipation can cause a "stagnation" in their life.

We want to handle these things well. We have a grid here that we can use, and we want to understand.

no one has ever had this kind of information

Now it's in the hands of the patient. We exist for the patient.

It's all about patient health care. We don't have doctors in our network.

this is about the patient

So how do we translate this into the health care setting and provide it as a tool to interact with the health care system?

We put our heads together and thought it through, and then we said, "What is something that we can use all the time, that we can use in our healthcare system, that everyone can understand?"

That's why the patient printed it out, because we're supposed to be a social network, and it's usually blocked by hospitals.

Printout is actually the most used feature on this website.

Doctors liked it too, they took a lot of interest in it.

It started with Steven's story and his story, then it became data, then it went back to paper, and then it started to work with the healthcare system.

here is the paper

This is a journal called PNAS, and if I remember correctly, its official name is Proceedings of the National Academy of Sciences. It's a journal of the United States.

You may have seen some of the achievements that many people were proud of today.

This is a report on a drug called lithium.

Lithium is a drug used to treat bipolar disorder, and a group in Italy reported slowing the progression of 16 people with ALS.

I'm not going to critique the paper here.

Simply put, if you're a patient, you want to be on the blue line.

I don't want to be on the red line I want to be on the blue line

Because the blue line is better, the red line is downhill, and the blue line is good.

I saw this and said that people will always blame Internet sites, accusing them of selling bad drugs or playing tricks on people.

The same thing happened when PNAS announced lithium.

Ten percent of the people in our system took lithium.

I made the decision to take lithium based on the examples of 16 people cited in poor publications.

But you say it's the internet that's irresponsible

I'll give you an example of what's going on

Here is a man named Humberto from Brazil, who unfortunately passed away nine months ago, and he said, "Hey, can you answer me?

Waiting for the next clinical trial would be years away...

I want to know now.Does it work? ”

At the request, we built some tools to track blood levels.

We also made it possible to share and exchange data with each other.

so-called data network

They said, "Can you tell me if Jamie Lithium from Patients Like Me works?"

So we talked to people all over the place, and they said, "You can't do a clinical trial like this, can you?

No blind study, no data, and no scientific method.

It's never going to go well, you can't do that."

I said, "I'm sure it's impossible, so I'm going to do something harder."

(Laughter) I can't say whether lithium works for all ALS patients, but I thought I could answer whether it works for Humberto.

I switched to a Mac two years ago, and I'm really excited about the new feature called Time Machine.

I said, "Why don't we build a time machine for our patients? Instead of going back in time, go forward into the future.

If you know what will happen in advance, you can change the future, right? ”

So we tried, and we collected data from all patients like Humberto -- and by the way, I didn't have time, so I'm using the Apple background -- and built a working application.

This is not just an image

We're going to collect data, look for patients like him, combine all the data, and add history.

And then we discussed, "How do we reassemble it?"

And then we arranged all the data points so that the key points overlapped and combined all the patient information.

Exactly all the information, the whole course of the disease, was kicked out.

It depicts the fate that awaits Humberto unless something is done.

he decided to take lithium over time

It's perfect almost every time

It's interesting to see the cases that come off.

But it hits me almost every time

It's scary in a way, but it's also beautiful.

We can't do clinical trials, we can't understand

But I knew Humberto would work.

The clinicians in the audience have something to say about power and standard deviation, and I'll talk about that later.

But here are the average results for patients who actually decided to take lithium.

All the patients here started taking lithium.

is the treatment intention curve

You can see the blue dots at the top, the bright colors. These are the people that were featured in the PNAS study, and the ones you want to be. You don't want to be the red dots or the pink dots below.

All the points in the middle are our patient's points, and the data are recorded before and after the start of the lithium dose at time 0.

You can see that the data match perfectly.

terrifyingly accurate match

As we move forward in time, it turns out that it's wiser not to take lithium.

It's going to get a little worse, not significantly, but it's definitely going to get worse.

But you see, a lot of people drop out of the exams, too many people drop out midway through.

can we do more? Can I go to the patient? A patient who decided to continue taking lithium, confident that he was getting better.

We looked at the control algorithm, and we looked at these 69 patients -- which is four times the number of patients in the clinical trial, by the way -- and could we say, "Can we use a time machine to match these 69 patients with patients who are similar to them, and what will happen?"

Even those who thought their results were getting better were in perfect contrast.

what about this little line? this is the power

We can't say that lithium doesn't work. We don't know if it's done in higher doses or if the experiment is done the right way. What we do know is that the 69 people who took lithium didn't do better than the similarly symptomatic patients who didn't take lithium.

A year ahead of us, we saw that the NIH's first multimillion-dollar clinical trial was announced last week as a failure.

Earlier I told you about my brother's stem cell transplant.

I'm not sure if it worked or not

I had 100 million cells implanted into his cisterna magna and lumbar spinal cord, filled out the IRB, had all the arrangements, but I never knew.

How come you didn't know?

In short, I didn't know what was going to happen to him.

So I asked Tim, he's a financial analyst in our group. Actually, for about a year, we've been looking for people in the medical field who could do math and statistics and modeling, but we couldn't find one, so we looked in the financial industry.

And then I found people who were doing interest rate forecasting and that kind of modeling.

Some people were free, so I decided to hire one.

(Laughter) I hired them to start working and help out in the lab.

I sent him an email, and that's how I interacted with him. To me, he's the little guy in the box.

he sent me this two days ago

It was a bit of an outlier. See that long-lived man?

I want to talk to him and find out what happened

something was wrong

My brother's case was different. His line went straight down.

Time machine is available for up to 12 months

This is the first version of Time Machine

It's the first time we've tried it, and we'll keep improving it. Right now, we can predict the next 12 months.

Seeing this makes me very emotional

You can look deep into all the controls in the patients you're looking at, you can look and you can ask questions.

I noticed a woman - she died, but I have the data.

The husband had entered his wife's last feature score because he knew how much she cared about the site.

I am thankful

I can't believe there are people like this, many years after my brother passed away, still trying to answer my question: did the million-dollar surgery I did a few years ago really help?

I wish I had the answers at the first surgery stage. Now I'm thrilled to have the answers. The lab I started has data on drugs that might work.

I want to show it in real time I want to show it now

Thank you to the 45,000 people who joined us in the social experiment.

Our journey is going to be amazing. It's a journey to be human again. It's a journey to bond with humans again. It's about sharing and being sensitive.

(applause)

I would like to start with a little experiment.

I'm going to ask you all to close your eyes and observe how you're feeling in this moment.

no need to tell anyone

The aim of this experiment is to find out how easy or difficult it is for you to know exactly what you're feeling.

give me 10 seconds

May I?

let's get started

yes it's about time

How was it?

Maybe I was feeling a little bit of pressure, maybe I was suspicious of the person next to me.

Are you really closing your eyes? and

Maybe you had a strange vague sense of unease about the email you sent this morning, or maybe you were excited about what you had planned for tonight.

Maybe there's a feeling of elation that comes from gathering all these people together. It's called "hwyl" in Welsh, which originally means "sail of a ship."

Or maybe you felt all I said

There are some emotions that paint the world in one color, like the feeling of fear when a car skids.

But more often than not, multiple emotions are shoved together, and it's actually pretty hard to tell them apart.

Some things go by so quickly that it's hard to even notice them, like when you pick up a familiar brand at the supermarket because of "nostalgia."

Then there are the emotions that make us scurry out of fear of being attacked, like jealousy, which makes us grope the pockets of our loved ones.

And then, of course, there are feelings that are so unique that I don't know what to call them.

You may have been sitting there and itching a little, an emotion that the eminent French sociologist called "ilinx," a state of excitement caused by trivial, disorderly behavior.

Let's say you stand up right here and dump the contents of your bag all over the floor.

You're probably going through a strange, inexplicable feeling, because there's no English equivalent for this feeling.

You may have felt "gezelligheid," the Dutch word for the feeling of being indoors with a friend on a cold, damp day, comfortably warm.

Or, if you're very lucky, you may have experienced this feeling, "basorexia," a sudden urge to kiss someone.

(Laughter) We live in a time when knowledge about emotions is a vital commodity. Emotions are used to explain a lot, they are used by politicians, they are manipulated by algorithms.

Emotional intelligence, the skill of recognizing and naming your own and others' emotions, is so important that it's taught in schools and workplaces and even recommended by public health care.

And yet, sometimes, I wonder if our way of thinking about emotions is becoming poorer.

Sometimes I don't even know what emotions are

As you may have heard, one theory says that all of our emotional lives can be boiled down to a handful of basic emotions.

It's actually an idea that's been around for about 2,000 years, but today, evolutionary psychologists argue that six emotions -- happiness, sadness, fear, disgust, anger, and surprise -- are the fundamental building blocks of our emotional lives because they are expressed in exactly the same way all over the world.

Now, when these emotions appear, they appear to be just reflexes, triggered by external circumstances, and they are inherent in humans, and exist to protect us from harm.

When you see a bear, your heart beats faster, your pupils dilate, you feel fear and you run very fast.

The problem with this idea is that it doesn't fully capture what emotions are.

Of course, physiology is extremely important, but it's not the only reason for how we feel at times.

What if a 12th-century bard, unlike us today, saw yawning not as a sign of fatigue or boredom, but as a sign of deep affection?

Or what if, in the same era, brave knights often fainted because of "dismay"?

What if the early Christians who lived in the desert believed that demons flew in, mainly at lunchtime, to infect them with an emotion called "accidie"? What if it's a kind of fatigue, and it's so intense that it often kills people?

Or what if the familiar "boredom" that we love so much now was originally a feeling influenced by the new ideas of leisure and self-improvement typical of the Victorians?

Why don't we reconsider these strange, untranslatable words for emotions, and what if in some cultures certain emotions have been felt more intensely because we've said them in words? For example, the Russian word "toska" expresses a maddening lack, which is said to blow up from the vast plains. [Craving without craving Nabokov]

Recent advances in cognitive science have shown that emotions are not just reflexes, but highly complex and flexible systems that are influenced by both our biological inheritance and the culture in which we live.

it's a cognitive phenomenon

It's shaped not just by the body, but by thoughts and concepts and language.

Neuroscientist Lisa Feldman Barrett was fascinated by the dynamic relationship between language and emotion.

She argues that when people learn new emotional words, new emotions follow.

As a historian, I've always believed that when language changes, emotions change.

It's clear from the past that emotions have changed, sometimes dramatically, in response to new cultural expectations, new religious beliefs, new ideas about gender, ethnicity, age, and even new political and economic ideologies.

Emotions have a history, and this is only recently beginning to be understood.

I totally agree that learning new words to express emotions can be helpful, but we need to go further.

To develop true emotional intelligence, you need to know where those words came from, what ideas about how to live and behave that accompanied them.

let me tell you a story

The story is set in an attic at the end of the 17th century in the university town of Basel, Switzerland.

A studious student lives 100 kilometers away from home.

He stopped showing up to lectures, and when his friends visited his room, they found the student exhausted, feverish, with palpitations and strange pains in his body.

A doctor was called, the situation seemed so serious, and prayers were held for him at the local church.

And as they prepare to take this dying young man back home, they realize what's going on, because as soon as they put him on the stretcher, the student's breathing becomes a little easier.

And by the time I reached the gates of my home city, I was almost fully recovered.

And then they realized that the students were suffering from a very strong sense of homesickness.

It was so powerful that it could have killed you.

In 1688, a young physician, Johannes Hoeffer, heard of this case and others like it, and coined the term "nostalgia."

The diagnosis quickly became popular in the European medical community.

The British thought that they might be immune from their travels in the empire and elsewhere.

Cases soon appeared in the UK as well.

The last death of nostalgia was an American soldier fighting in France during World War I.

Is it possible to die of nostalgia less than 100 years ago?

But in modern times, the meaning of the word has changed, and not only have we become ill with lost time rather than lost place, but homesickness itself has been downgraded from something that's not very serious -- from a deathly illness to, at best, worrying about your child at a sleepover.

This change seems to have happened in the first half of the 20th century.

But why?

With the invention of the telephone or with the development of railroads?

Or is it because the advent of modernity has made busyness, mobility, and progress so popular that craving for the familiar has been seen as a lack of ambition?

You and I inherited that enormous shift in values, and it's one of the reasons we don't feel as homesick as we used to.

What we need to understand is that these major historical changes affect our emotions because they affect how we feel about them.

Happiness is celebrated today

It is said that happiness leads to better work, better parents and spouses. It is also said that happiness increases life expectancy.

In the 16th century, it was thought that "grief" had these effects.

If you read self-help books of the time, they would list reasons for despondency and even try to make you sad.

(Laughter) The authors of self-help books thought that you could master grief as a skill, and that mastery would help you recover from misfortune more quickly, because bad things can always happen.

there will be something to learn from this

Feeling sad these days can be frustrating and even embarrassing.

In the 16th century, you might have some fun

Of course, not only do emotions change over time, emotions also change from place to place.

The Baining people of Papua New Guinea say "awumbuk" to describe the feeling of lethargy that descends when guests finally leave.

(Laughter) Maybe you and I would be "relieved." But in Bai Ninh culture, departing guests are said to travel more easily by shedding their heaviness.

So they leave a bowl of water overnight to let them breathe in this air, and then they wake up early the next morning to perform a ritual and throw out the water.

This is a great example of combining a spiritual practice with a geographical reality to create and re-extinguish a unique feeling.

One of my favorite emotions is the Japanese word "amae."

"Amae" is a very common word in Japan, but it's quite difficult to translate.

Amae is the joy you get when you temporarily hand over responsibility for your life to someone else.

(Laughter) Now, anthropologists argue that Japan's traditional collectivist culture may be one of the reasons why the word was coined and cherished in Japan. On the other hand, the sense of "dependence" may be more stressful for English speakers who have learned to value self-sufficiency and individualism.

This claim may be a little short-sighted, but it's intriguing.

Emotional language conveys not only what we feel, but what we value most.

Many of those who preach to pay attention to mental health say it's important to put emotions into words.

But the names given to emotions are not neutral labels.

They contain the values ​​and expectations of our culture and represent the way we think about ourselves.

Learning new and unfamiliar emotional languages ​​can help you capture more nuanced aspects of your mental life.

But more than that, I think it's worth cherishing these words because they remind us of how powerful the connection is between how we think and how we feel as a result.

True emotional intelligence requires an understanding of the social, political, and cultural influences that have shaped the way we think about emotions that we have cultivated, and an understanding that emotions such as happiness, hate, love, and anger may still be changing.

Because if we want to measure emotions, if we want to teach emotions in schools, if we want to listen to what politicians say about the importance of emotions, then we should understand where our ideas about emotions come from, and whether they still really have something to say to us.

Let me conclude with a sentiment I often feel in my work as a historian.

It's French for "dépaysement"

to be confused and dizzy in an unfamiliar place

What I love about my work as a historian is that things we take for granted, parts of life that are very familiar can suddenly become strange again.

"Depaysmon" is both disturbing and exciting.

And now, I hope you all feel a little bit of that.

thank you

(applause)

i am studying bonobos

I'm very happy, because bonobos are the most peaceful animals on the planet.

little known

Bonobos live only in the Congo.

Not often in zoos because of realistic sexual behavior.

Sexual behavior is so similar to humans that it's embarrassing.

(Laughter) However, (Laughter) there's a lot to learn, and the bonobo society is very equal and intimate.

Sexual activity is not isolated, it is an integral part of life.

sexual activity is part of life

communication and

used as a means of reconciliation

We humans have somehow divided our lives.

I've sorted it into many categories.

And there's a place for categorized things to fit

But I don't think it was at first

Many people think that animals are rigid, and that humans are very, very special.

have the ability to think

And the ability to use language thanks to a specialized brain.

In addition, this special brain allows us to make tools and perform calculations.

But let's face it, discovered around 1600, the Tasmanians didn't know fire.

didn't use stone tools

There is no evidence that he enjoyed the music

Compared to bonobos, bonobos seem to have more hair.

Weak uprightness

have a lot in common

From a cultural standpoint, I feel like I can understand how we got to where we are today.

I don't think it's biologically inherited.

Now let me introduce you to the bonobos.

It's Kanji

It's a male bonobo

now in the woods of georgia

Mother's hometown is African forest

My mother came around the time of puberty, when she was six or seven years old.

Bonobo on the right, chimpanzee on the left

Clearly, chimpanzees are not as good at walking.

Bonobos are shorter than humans and have longer arms, but they stand upright like us.

A comparison between bonobos and Lucy-like Australopithecus.

There's very little difference. A bonobo's gait is the same as an Australopithecus' gait.

When viewed from the front, the Australopithecus pelvis is a little flatter, allowing less movement of the hips.

so bipedalism is a little easier

Let's look at 4 at the same time

Bonobos in the wild live in the jungles of Central Africa, an area surrounded by the Congo River.

The trees in the forest reach a height of 40m and grow densely.

Japanese researchers were the first to study bonobos, about 30 years ago.

Bonobos are smaller than chimpanzees

It is a skinny creature with a very calm personality.

After long and intense research, I discovered a lot.

One is that bonobos in the wild are frequently bipedal.

In addition, bonobos can travel long distances by walking upright.

First say hello to Austin and go to the hut

Kanji and I in the forest

All the videos I'm going to show you are untrained.

not cheating

It was filmed by NHK in Japan, who happened to be there.

I have eight bonobos.

Everything you need for camping

the whole family of the institute

Can you pick me a branch?

good

i want more branches

I have a lighter in my pocket if you need it.

beehive

can i take it out

I hope there is

Start a fire with a lighter

Kanji is very interested in fire

You can't make a fire without a lighter yet, but if you see someone make a fire without a lighter, you will.

Kanji is learning how to keep the fire burning.

They're learning how to use fire, they're observing our behavior.

(Laughter) It's a bonobo smile.

It's a voice when I'm happy

It's interesting

this is so much fun

Do you know where the water is?

good

I forgot to close half of my backpack

i like to carry things

Austin, you said Austin

In the lab, we talk to bonobos so far away that we can't hear them.

my sister

driving a golf cart for the first time

bye bye

(Laughter) I can push the pedals, but not the steering wheel.

I switched from back to drive I can't turn the steering wheel while holding it

(Laughter) I see myself in the mirror, just like we do.

(Music) We documented the development of bonobos over a period of 20 years while raising them in a human environment, and researchers are studying the influence of cultural factors (Laughter) on human evolution.

My name is Nyota

It means star in Swahili

(Music) Panbanisha is using scissors to cut Nyota's hair.

In the wild, bonobo parents groom their young.

Panbanisha uses scissors instead of hands to groom Nyota.

great

If you're not good with your hands, you can't do such delicate things.

Nyota tries to imitate Panbanisha by using scissors.

Panbanisha gently picks up the scissors just like a human mother so that Nyota doesn't get hurt.

Can also cut through tough animal fur

I also learned how to make stone tools

Kanji is trying to make a tool, maybe the same way our ancestors did, 2.5 million years ago, holding a stone in each hand and banging one against the other.

Using both hands to strike at an angle creates larger, sharper flakes.

Kanji chooses flakes that he thinks are sharp enough.

Hard fur is difficult to cut, even with a knife.

The stone that Kanji uses is very hard and perfect for making stone tools, but it is difficult to master and requires great skill.

The Kanzi stone is from Gona, Ethiopia, 2.5 million years ago, the same stone used by our African ancestors.

It's the stone Kanji used, and it's the flake Kanji made.

The flat, sharp edges are like knife blades.

When compared to the tools used by our ancestors, they are very similar to Kanji's.

Panbanisha wants to go outside

I'm staring out the window

Let me show you something you never expected

Panbanisha hasn't been outside for several days.

I usually talk about language

Panbanisha does unexpected things

But now I'm being told not to do what I normally do. I didn't tell you that bonobos have languages.

is a graphical language

I take the chalk and start writing something on the floor.

what are you writing

I also say the letter names aloud

Now approach Dr. Sue and start writing again.

there are letters on the keyboard

(music) touch and talk

Panbanisha is telling Dr. Su where she wants to go.

A-Frame is a cabin in the woods

Compare what you've written in chalk with the emoji on your keyboard.

Panbanisha starts writing emojis even outdoors

Very good Panbanisha

At first I didn't realize what it was doing, but when I turned it a little further away, I could see it.

This emoji also indicates a place with a forest

The curve looks just like an emoji

The next thing Panbanisha will write is a collar

When Panbanisha goes outside, it is customary to wear a collar.

facility rules

It's not as descriptive as the other characters, but you can see that Panbanisha tried to draw some curves and some straight lines.

The researchers used pictograms to record what Panbanisha said on the floor with chalk.

Panbanisha saw the situation

I started writing myself

Bonobo's abilities have amazed scientists around the world

how did it develop

The most important finding is that to get bonobos to learn a language, you don't have to teach it.

Use the language that surrounds your bonobo, because the key to learning a language is understanding what your significant other is saying to you.

Once you have that ability, your aptitude for using language becomes very natural and free.

So we wanted to create an environment where they could interact freely with their peers, an environment where they could have fun and spend their time meaningfully.

Such an environment has brought out unexpected potential in Kanji and Panbanisha.

Panbanisha is enjoying the harmonica.

and look into your mother's mouth

Are you looking for the source of the sound?

Dr. Hsu thinks it's important to satisfy that curiosity.

Panbanisha is now playing the electronic piano

I wasn't forced to do it. I was interested in watching the researchers play it.

Play it, play it, I'm listening

Play the fast part again, yeah, yeah, right there

Kanji is playing the xylophone, gleefully using both hands to accompany Dr. Su's song.

Kanji and Panbanisha are inspired by this fun-filled environment, which brings out their cultural talents.

(Laughter) So go get that monster and go for it.

take a cherry

Be careful, don't get too close

It's time to chase again, go

I'm going to leave this time and run away

run away run away

You can chase it again!

Ah

kanji good job thank you very much

Neither bonobos nor humans imagined this possible.

Gradually, we have this kind of dual environment, which we call "pan-human culture."

We're researching how to become like bonobos.

I'm researching how to use a high-pitched voice to converse with them.

Bonobos may use language in the wild

Bonobos are learning to be like us.

This is not a biology issue, it's a culture issue.

We share tools, technology and language with other species.

thank you

What I want to talk to you about is how we deliver healthcare in a world where cost is paramount.

What should I do?

The basic idea that I would like to propose is that in order to treat a disease, you first have to know what you are treating, which is to diagnose and then treat.

We call this activity "clinical testing for everyone" or "zero-cost clinical testing."

How can we provide medically relevant information at a cost as close to zero as possible?

what do you do?

I'll give you two examples

The challenges of military medicine aren't all that different from those of the Third World: scarcity of resources, difficult environments, and all the rest of the world, including lightness issues.

It's not that different from home health care or diagnostic systems.

So what I'm going to talk about is for third world developing countries, but I think it has broader applicability, because information is so important in the healthcare system.

here are two examples

One is the best testing facility in Africa (bottom right).

The other is basically a merchant, who sets up a table in the market and does some obscure thing.

I don't know the medical situation there.

It's certainly not the most efficient

what is our approach?

Our typical approach to the problem of lowering costs is to start from the perspective of the United States and use our solution to lower the cost.

No matter what you do, you can't start with a $100,000 machine and go to zero cost.

not going so well

So we did the exact opposite: build the cheapest diagnostic machine, extract useful information, and add functionality.

The answer was paper

this is a prototype

About 1 cm on a side

it's the size of a fingernail

Edge line is polymer

because it's made of paper

It soaks up liquids, like paper, cloth, etc. When you spill wine on a tablecloth, the wine spreads all over.

Spill it on your shirt and it'll be ruined

On hydrophilic surfaces it does

So in this device, you put a drop of urine at the bottom.

The liquid seeps into the upper compartments.

The amount of glucose in the urine is shown in brown, and the amount of protein in blue.

The combination of these two is the first step in what you want to inspect.

Here's an example of a device made out of plain paper.

How easy can you make this?

Why did you choose paper?

There is an example where I actually put it on my fingertip, so you can see what it feels like.

One of the reasons we use paper is because it's everywhere.

We built these devices out of napkins, toilet paper, wrapping paper, and all sorts of other things.

you can use almost anything

The second is that you can pack a lot of tests into a small package.

I'll show you later that you can analyze about 100,000 tests on a single stack of paper.

And the third thing, which is something we don't really think about in medicine all over the world, is that it doesn't contain any sharp parts.

A sharp object is a needle or something like that.

If someone's blood you take might have the hepatitis C virus, you accidentally put the needle in yourself.

I don't want to stab you

And there's also the issue of disposal.

If it's paper, just burn it

It's a pragmatic approach to start with.

But if the paper is just right, someone must have already thought of it.

The answer is yes of course

About half of you here are women, and some of you may have taken a pregnancy test.

In that case, a typical testing device would be something like the one shown on the left.

It's called a "lateral flow immunoassay."

In this test, a strip is used to look for a hormone called "human chorionic gonadotropin" in the urine.

There are two lines, the first line indicates if the test is working, and if the second line appears, you're pregnant.

This is a great test if it's a binary test. If you're pregnant, thankfully you can only say yes or no.

In that case, it works very well, but when you want more quantitative results, it doesn't work.

I also have a dipstick, this dipstick is for another urine test.

There are many colors

What about complex tests?

We asked ourselves, "Is it practical to build something like this?"

This was solved purely technically

The procedure simply starts with paper.

We do it with a new type of "wax printer."

A wax printer does something like a printer.

I'm going to print

You put the wax on, heat it up, and the wax prints, soaks into the paper, and you get the test strip you want.

printer is around $800

It's estimated that 24 hours a day, we'll be able to do 10 million tests a year.

So this problem is solved

You can do something like what you're seeing

Printed on 20 X 30 cm paper

One sheet can be made in about 2 seconds

It can be said that it is completed

And here's the big point: this is a printer, so it's a color printer, so it can print colors.

that is very helpful

So the next question is, what are we going to measure? Right, what are we going to analyze?

What I want to analyze most is difficult to measure

"Fever of unknown cause"

Somebody comes into the clinic, has a fever, feels unwell, what's the diagnosis?

Tuberculosis? AIDS? Just the common cold?

It's a matter of triage

I won't go into detail, but it's a conundrum.

There are so many things I want to identify

Some are simple, such as diagnosing diseases like AIDS, hepatitis, malaria, and tuberculosis, and indicators of treatment effectiveness.

But it's still a lot more complicated than you might imagine.

A friend of mine works in comparative cultural psychiatry, and he's interested in why people don't take drugs.

have to take it for a while

I have a story about a wonderful conversation I had with an Indian villager about a drug called "Dapson." "Did you take Dapsone?" "Yes."

"Do you drink every day?" "Yes"

"Did you drink for a month?" "Yes"

What the villagers are saying is that they actually put together a 30-day supply of dapsone this morning and gave it to the dog.

(Laughter) He's serious, because in some cultures, the dog is your surrogate, and there are so many possibilities for misunderstandings like "today," "this month," "since the rainy season."

(Laughter) It means that sometimes even the little things like "follow the doctor's orders" can be a problem.

Let's see what a typical test would look like

I prick my finger and draw blood, about 50 microliters.

You can only get so much. You can't use ordinary equipment.

I can't do the hard work, so I'll show you later.

Once you've drawn the blood, don't mess with it any further, just drop it straight into this device, and the device will filter the blood cells, allowing the serum to pass through, and you'll see some colors at the bottom.

Color indicates whether you are sick or normal.

But it's still complicated, because different people have different criteria for what the color "normal" is, and ultimately we're suffering from over-education.

What if I need quantitative analysis?

The solutions that we and others have come up with, and that are rapidly becoming the solution to everything today, are cell phones, and in this case, camera phones in particular.

It's ubiquitous in India and sells 6 million units a month.

So what we're going to do is, first, we'll use the instrument to test it, and you'll see the color, and we'll take a picture and send it to the testing center.

You don't have to send a doctor, you just send someone who can draw blood, and in the clinic, a doctor or, in this case, ideally a computer, analyzes it.

I've found that it works very well, especially when the color swatches are printed, because I know how to evaluate the results.

So I believe that the health care workers of the future are not doctors, but 18-year-old boys or unemployed people with backpacks full of test kits, needles for the occasional blood draw, and a machine gun.

That's how I get the job done.

(Laughter) Another interesting connection is that what we want to do is send useful information over a very poor quality telephone system.

There's already a lot of information about this problem, it's called the Mars Rover problem.

How was it possible to send accurate color images from Mars with so little bandwidth?

The answer is not very complicated, but I'm not going to pursue that point today, but the communication systems that are used for this kind of thing are very well developed.

And what you may not know is that your mobile phone's computing power is not much different than your computer's.

The potential of mobile phones is just beginning to be exploited.

I don't know if the OLPC (PC for Every Child) plan makes sense.

The future of computers is here, they have screens, we all have them

I'll show you more advanced instruments.

Let's start with a small question

This is another one-centimeter-sized device, and each colored part is a different dye.

So, you might be a little surprised, but what's interesting is that the yellow line disappears in the middle, and then goes through the blue line and then the red line.

how on earth

Are you going through another color?

The answer is "I don't do that"

Let it pass up or down

So how can you go over or under a piece of paper?

So here's the answer: I'm going to skip the details, but I'm going to do something a little more elaborate. Stack up a stack of papers, make a unique groove in each one, and separate them with double-sided tape.

liquid flows from one layer to the next

Spreading through the hole Spreading through the hole

The bottom right image shows the blood dripping on top, spreading from paper to paper, and then entering 16 holes at the bottom, two sheets of paper thick and looking like a computer chip.

Especially in this case, we're only looking at reproducibility.

But in principle, it solves the "unexplained fever" problem, because each of these spots is a combination of markers that can detect a particular disease, which will come in handy when the time comes.

This is a slightly more complicated instrument.

i have a chip

when you dip the corner

the liquid penetrates to the center

It reaches some holes and changes color, and it's all done with paper and double-sided tape.

I think this is the lowest cost production method imaginable.

Now, at the end of this presentation, I'd like to say two things.

One is this, which is used to separate the serum from the blood cells.

The problem is usually put the sample in the centrifuge, spin it, and remove the blood cells.

splendid

But what if you don't have electricity or a centrifuge?

I thought about what to do for a while, and what you see is what I came up with.

It's a whisk that's everywhere. Remove the wire and glue the tube onto it.

I put blood in it and do it in circles

works very well

We thought about the physics of the whisk, the self-aligning tube, and all that, and submitted it to an academic journal.

I'm very proud of it, especially since the title is "Centrifugation with a whisk."

(Laughter) I sent it in, and it was returned immediately.

I called my editor and said, "What the fuck is going on?"

The editor said with obvious disdain, "I read it, but I won't publish it.

We deal only with scientific content."

(Laughter) And this is important because we have to think about the value of things as a society.

Maybe it's not just a problem for Physical Review Letters? and

So here's another example, this is a spectrophotometer.

Measure the absorbance of the sample

It has a light source that blinks at about 1,000 hertz, and we're going to have another 1,000 hertz light detector, so we can use it in daylight.

That's what a million-dollar machine does.

it's only $50

it might go down to 5 cents

why no one wants to do it why?

"Because in this capitalist society, you can't make money that way."

interesting question

Closing remarks, we thought of this as an engineering problem.

And I asked, "What is the scientific solution here?"

And I decided to look at the problem in terms of simplicity rather than cost.

"Simplicity" is a nice word

what does it mean

I know the word, but I don't know what it really means

So I got interested and got some people together.

These guys from MIT recently came in, and one of them was super smart and one of the few people I would call a "genuine genius."

We spent the day thinking about simplicity.

The real scientific conclusion we've come to is this.

[What is Simplicity?

"It sucks."] (Laughter) In a way, you get what you pay for.

Thank you very much

(applause)

I'm an oncologist. It was three or four years ago when I walked out of my office and walked past the pharmacy in the hospital, and I saw this cover of Fortune magazine [Why can't we win the war on cancer].

And as an oncologist, when I see this [why can't we win the war on cancer], it's a little disappointing [why can't we win the war on cancer].

But when you read Cliff, a cancer survivor himself — he too was saved by a clinical trial, where his parents drove him from New York City to a nearby town to treat him for Hodgkin's disease (malignant lymphoma) — he makes an excellent point in that article.

It says, "We've become trapped in reductionism in terms of biology and cancer."

For the last 50 years, we've tried to understand cancer by looking at individual genes, but we've never tried to control cancer.

This is an astounding table [Trends in mortality rates in the United States, by cause of death]

This wakes us up every day in the medical field. Clearly, we've made tremendous progress in treating cardiovascular disease, but cancer mortality is the same as it was 50 years ago.

We've had some small victories with chronic myelogenous leukemia, developing a drug that puts 100 percent of patients in remission, but overall we haven't made much of a difference in the fight against cancer.

So today, I'd like to talk to you about why we're in this situation in the fight against cancer, and where we're moving out of our comfort zones, and where researchers and the fight against cancer are headed, and about new approaches to cancer care that we hope to push forward.

because this situation is wrong

First of all, what is cancer?

If you see a lump or see an abnormal blood test result, the doctor inserts a needle into it.

Diagnosis today is done with pattern recognition. Does this look normal or does it look abnormal?

A pathologist is like looking at this plastic bottle.

These are normal cells and these are cancer cells.

This is the state of the art in cancer diagnostics today.

No molecular testing, no genetic sequencing, no detailed chromosomal analysis.

That's the way it's being used today and it's state of the art.

As an oncologist, I know all too well that advanced cancer cannot be cured.

As an aside, I have high hopes for the field of early detection.

Early detection is the only way to win

Most cancers can be prevented

My previous speaker talked about heart disease prevention.

You can do the same for cancer

I'm the co-founder of a company called Navigenics, and I'm spitting it into a test tube and looking at 35 to 40 disease genetic markers, all of which can slow the progression of many cancers, so we can see which cancers you're more likely to get and then prevent them.

The problem with advanced cancer is that the statistics show that we are limited in what we can do today.

Cancer is a disease that affects the elderly

Why is it a disease that affects the elderly?

This is because the mechanism of evolution is irrelevant after leaving offspring.

Evolution protects you until you reach childbearing age, but when you get from 35 to 40 to 45, it doesn't matter anymore because you've already left offspring.

So, the number of cancer cases in children is extremely low, only a few thousand a year.

But as we get older, cancer becomes a very common case.

Why is it so difficult to treat?

Cancer is made up of multiple types of cells, and that's the perfect conditions for cancer growth.

Malignant and aggressive cells are selected, this is called clonal selection.

But when we realize that cancer is caused by something more than just a molecular glitch, we can find new treatments.

The fundamental problem with cancer is that we tend to dismiss it as adjectives, symptoms only, like, "I'm tired, swollen, and in pain."

And then you get an anatomical description, you get a CT scan, and you say, "You have a 3-centimeter mass in your liver."

Then there will be a description of each part of the body: "(The tumors are) in the liver, breast and prostate."

That's all

Our dictionary describing cancer is very, very poor.

Cancer is expressed by symptoms

that is expressed by the manifestation of symptoms

In the last two to three years, the U.S. government has invested 400 million dollars, and an additional 1 billion dollars has also been invested in the Cancer Genome Atlas Project.

This project was born from the idea of ​​trying to read all cancer genes, and is trying to create a new vocabulary, a dictionary, to explain cancer.

In the mid-1850s, in France, the practice of describing cancer by body part began.

It hasn't changed in 150 years

Naming cancers by body part is very old-fashioned: prostate, breast, muscle.

Come to think of it, this is pointless

Today, obviously, we have the technology, and in the next five or six years, that's going to change.

You will no longer have to go to a breast cancer clinic

You'll go to "HER2-amplified cancer" clinics and "activated EGFR cancer" clinics, and you'll be able to focus on some of the genetic alterations that caused individual cancers.

Hopefully, we'll be able to move from the art of medicine to medicine as a science, where we can look at the bacteria that cause the disease and decide whether antibiotics will work for that patient, just like we do in treating infections, and treat them on a scientific basis.

When we're exposed to H1N1, we can take Tamiflu (an anti-influenza drug) to significantly reduce symptoms and prevent the onset of flu symptoms.

why? Because we know what the patient has and what treatments are effective, and we can't go as far as developing a vaccine in this country, but that's another story.

The Cancer Genome Atlas Project is beginning to pay off

The first case was a malignant tumor of the brain.

At the end of next December, we'll have ovarian cancer, and in a few months, we'll have the analysis for lung cancer.

There's also the field of proteomics, and I think proteomics is the field that will lead us to the next step in classifying and understanding disease.

But I'm not going to go into genomics and proteomics and just dig into the elements.

I'm trying to figure out what to fight from these pursuits.

I'll talk about that important difference later.

In healthcare today, we spend most of our money in the last two years of a patient's life.

To analyze what kind of disease we are fighting,

Very little money is being put into this

If we can put our efforts into it, we can improve the situation by several orders of magnitude, and if we can do prevention, we can dramatically change the situation, because we have to move forward in the fight against cancer.

This is the site of the National Cancer Institute (NCI)

My point here is that this is wrong.

The NCI website says cancer is a genetic disease.

The website says that from the first individual mutation, the second, third, and overlapping mutations cause cancer.

But my view as an oncologist is

this is not a genetic disease

This is a liver that has metastasized colon cancer, and if you look under the microscope, you can see the lymph nodes that have been invaded by the cancer.

A CT scan can confirm that the cancer is in the liver

Cancers are cells that have lost their growth control from the (normal) surrounding tissue.

Not in an abstract sense, but in interaction with the environment.

This is the phenomenon we call the system.

My goal as an oncologist is not to understand cancer.

We've been trying to understand cancer, and that's the fundamental mistake of the last 50 years.

In fact, the goal should be to control

That allows us to develop a completely different optimization strategy for each of us.

At a big cancer research gathering of 20,000 people, the American Association for Cancer Research (AACR) annual meeting, I said, "We made a mistake."

"All of us, myself included, made mistakes in our reductionist view of the elements.

We have to take a step back and rethink.”

It's hard to believe, but some people booed.

We were all stunned, but this is an inevitable move forward.

A few years ago, I had the privilege of meeting Danny Hillis.

We were urged to meet each other, so I

"What would you do if you met the Disney employee who designed the computer?"

And Danny was like, "What am I going to do when I see another doctor?"

We were pushed to meet, but it turned out to be a completely life-changing event.

We designed a model of cancer in the body as a complex system, largely inspired by Danny and his team.

I'm going to show you some data, a new approach to cancer that can produce different results.

The bottom line is that when you look at these data, you need to understand the details of the input data.

Suppose we take your temperature for 30 days.

The answer says great if it's about 36.7 degrees

But if your temperature was up to about 38.8 degrees Celsius for six hours during that time, and the antipyretics helped bring the fever down, then I'm totally missing that information.

So the fundamental problem with healthcare is that we only see our primary care physician once a year.

With this, you can only see the data at one point in time, not how it changes over time.

this device

I have been using it for 2 and a half months

This is an amazing device, not because it tells me how many calories I burn each day, but because it keeps track of what I've been doing 24 hours a day.

I sat at my desk for three hours and didn't realize that I wasn't moving at all.

Only superficial information can be read from the input data alone, and it is difficult to understand the truth hidden behind it.

If you think of cancer as a system, there is a state between the input and the output.

This condition is the history of the disease, the patient himself, and the environment, diet, treatment, and genetic mutations are the inputs.

Symptoms will be output Do you have pain? Has the cancer grown? Are you swollen? etc

Most of the states are not clear

In our field, we use aggressive chemotherapy to try to change the input, and then we ask if the output is improved, if the pain is improved.

The difficulty is that this is not a single system, but multiple systems at different scales.

A system consisting of multiple systems

By observing neurons under a microscope, we can understand the "emergence" of a system.

When you look at a single neuron under a microscope, it's very impressive to see the patterns that stick out here and there.

The bad news is that these "robust" -- and robust is the key word -- "emergent" systems are very hard to understand in detail.

On the one hand, the good news is that we can make changes to these systems.

You can try to control this system without understanding all the basic elements.

One of the most important cancer clinical trials, published in the February issue of the New England Journal of Medicine, is the worst case of breast cancer.

For premenopausal breast cancer patients

After receiving chemotherapy, the patients were randomized, half to a placebo group and the other half to the bone-building zoledronic acid.

Zoledronic acid is a drug used for osteoporosis. Participants were given zoledronic acid twice a year.

From the data of these 1,800 women, we found that by administering a bone-building drug twice a year, the drug did not even touch the cancer itself.

We were able to reduce the cancer recurrence rate by 35 percent.

It's like if you change the soil, the seed won't grow.

So changing the system could have a significant effect on cancer.

Nobody realized until now, and shockingly enough, that most chemotherapy drugs that attack cancer cells directly

something that has never been done before

A brilliant experiment done in a tissue culture dish allows us to exert the effect of this anticancer drug on cancer cells, but the amount of drug in the dish is nothing compared to the amount that would be administered to the human body.

If you give women with breast cancer a drug called Taxol, a standard of care every three weeks, 40 percent of women with metastatic disease respond wonderfully.

That response is 50 percent contraction.

It's not a question of digits, that's another matter.

Then the cancer comes back, this time with the same drug every week.

30% will respond this time

And then when they relapse again, they give them the same drug, this time with a continuous infusion for 96 hours, and another 20% to 30% of patients respond.

I don't know if different doses of anticancer drugs have the same mechanism of action.

maybe not i have no idea

Given that chemotherapy disrupts a complex system, it may be that just as bone formation disrupts the system and prevents recurrence, chemotherapy works by exactly the same mechanism.

What's amazing about the clinical trial is that it reduced new, primary cancers by as much as 30 percent.

The problem is, you and I, our bodily systems are constantly changing.

they are always dynamic

This slide is a terrifying slide, and it shows obesity in the world.

I'm sorry I can't see the numbers.

Over 75% of the population in the countries shown in dark red are obese.

If you look 10 years ago, 20 years ago, there's a marked difference.

Our system has undergone a dramatic transformation, and the situation is completely different from what it was 20 years ago.

The diseases we face today, which reflect the patterns of the system from decades ago, will change dramatically in the next decade or so.

This is a beautiful picture, but it's 40 gigabytes, and it's a picture of the entire proteome.

This is a drop of blood that has passed through a superconducting electromagnet, and can distinguish between all the proteins in your body.

You will be able to see "system"

Each red dot is a protein

The power of electromagnets has made it possible for us to be able to see individual neutrons with this technology.

So that's what we're doing with Danny Hillis in a group called "Applied Proteomics," where you can look at the differences between individual neutrons and see systems from angles you've never seen before.

Instead of just thinking about the elements, we took a step back.

I'm a 46-year-old woman with recurrent lung cancer.

Recurrences were seen in the brain, lungs and liver.

I was given carboplatin taxol carboplatin taxotere gemcitabine navelbine and it just got worse.

This patient has three children under the age of 12 and a CT scan.

This is a cross-section of a patient's body, the middle part is the heart, and you can see on the left is a large tumor that, if not treated, will kill you in a matter of weeks.

A drug that targets a cancer signaling pathway is administered once a day. We don't know if this pathway exists in the cancer system.

After 6 months the cancer is still gone

But the cancer recurred, and the patient died of lung cancer three years later.

that's about it

The problem is, when the clinical trial ended -- we were involved in that clinical trial -- we refused to use placebo in this fundamental, pivotal Phase III clinical trial.

If your mom or brother had terminal lung cancer and only had a few weeks to live, would you let them use a placebo?

the answer is obviously no

This group of patients was given the drug

10% of the patients had a dramatic response like what you see here, and this drug was sent to the U.S. Food and Drug Administration, where they wondered how they could say that the drug did well in a placebo-free trial.

The morning of the FDA meeting, this was an editorial in the Wall Street Journal ["FDA to Patients: Drop Dead"].

(Laughter) However, the drug was approved.

What was surprising was that another company had done the right thing, giving half the placebo and half the drug, and doing a clinical trial.

I found that important

The study was conducted in South America and Canada, where placebo prescribing is considered more ethical.

Because the placebo trial was eventually done in the United States to get the drug approved, there must have been at least three patients in a clinical trial in the United States, in upstate New York.

In that clinical trial, 70% of patients who didn't respond to the drug lived better and longer than those who received the placebo.

This made us question everything we knew about cancer, we don't need to get a response

No need to shrink cancer

It may be that simply slowing the progression of the cancer will yield more benefits in terms of patient survival, outcomes, and mental health than shrinking the cancer.

The problem is, I'm a doctor and I do a CT scan, and a 2 cm tumor is found in the patient's liver.

on what basis can you judge

Would it have been 10 cm without the drug, or what if the drug had no effect and only cost?

this is a fundamental problem

New technology can help here

The goal is to go see a doctor, the ultimate goal is

To prevent all symptoms, right?

It's the most efficient and cost-effective method of choice today.

But if you're unlucky enough to get sick, you can see a doctor and get a blood test to find out how to fight the disease.

To do this, we go into the field of proteomics and look at systems.

It's a way to see the big picture

The problem with this kind of technology is that when you look at proteins in your body, there are 11 orders of magnitude (100 billion fold) differences in their concentrations between high and low abundance proteins.

There's 11 orders of magnitude difference, and we don't yet have the technology to handle that density difference.

We've taken engineering principles, we've taken software, and people like Danny Hillis have tried a lot.

Now we can look at different proteins in this concentration range.

Earlier, there was the topic of cross-disciplinary collaboration.

One of the things that's happening now is people from all walks of life are starting to get involved in cancer research.

Yesterday, the NCI announced a new program in materials science and oncology, bringing physicists and mathematicians into cancer research, people who have never been involved in cancer research before.

It was announced yesterday that Danny and I have been awarded $16 million in research funding to tackle this problem.

It's a completely new approach that is an alternative to high doses of anticancer drugs, an approach that looks at the big picture of what's going on in the body based on a different mechanism.

It's just a little bit important to understand how these technologies work.

All proteins in the body carry an electric charge, so when they are sprayed in a magnetic field, they are given a rotational force and detected by a detector at the exit of the instrument.

Detection depends on protein mass and charge

If the magnet is strong enough and the resolution of the analyzer is high enough, we can detect all the proteins in the body and start to understand individual systems.

As an oncologist, the future of doctor's office data will be dominated by images like these, instead of thick paper charts of your medical history, where a single drop of blood creates gigabytes of data.

Elements of electronic data capture disease from all angles

The goal, of course, is to learn from patient encounters, and to move forward, rather than just having patient encounters without fundamental learning.

The bottom line is that we should move away from reductionist thinking of the elements alone.

you have to start thinking revolutionary

I want you to have new perspectives and come up with new ideas.

And I want people in this field, myself included, to know that, because nothing has changed in the last 59 years.

we need a revolutionary different approach

When Andy Grove stepped down from Intel's board of directors, Andy was a good mentor and a tough guy.

When Andy retired, he said, "The technology wins, not the technology."

As someone in the medical community, and especially in cancer, I am convinced that multidisciplinary technology will move us forward and save patients in the near future.

thank you

(John Hockenberry) Nice to meet you.

First of all, I would like to ask you something that I have been wanting to know since I saw your work for the first time.

Your work has always been of a composite nature, with the forces of nature and creativity interacting with each other.

Are the two forces balanced in your work?

(Tom Shannon) What I'm looking for is solving questions.

For example, the question is, if there was a cone connecting the sun and the earth, what would it look like?

What is the ratio of the lengths of the sphere and cone? How does the cone taper towards the earth?

I actually made it into a bronze sculpture.

about 10 meters long

The diameter on the side of the sun is about 10 centimeters, and it gradually narrows down to 10 centimeters in diameter at the end on the side of the earth.

What it looks like is very interesting to me. It's like being an astronaut, stepping out and looking at the sun and the earth as objects in a larger context.

(Hockenberry) Do you feel at ease when you turn this kind of power into a work?

Also, I think the feeling of discovering something is great.

CA: There's this silver object, which is magnetically suspended in the air, and to get there, we experimented hundreds of times with magnets, trying to find a way to levitate the object with as little connection to the platform as possible.

I was able to float with only one attachment point.

(Hockenberry) Is it an electromagnet? or

(Shannon) It's a permanent magnet.

(Hockenberry) An electromagnet would make a loud noise when it's switched off.

(Shannon) yeah

It's boring to have to plug in the plugs one by one

(Hockenberry) Right

CA: My work with magnets is a combination of gravity and magnetism, and it kind of mixes these forces that are all over the place.

The field of the sun's influence is huge and extends beyond the planet, and we are protected by the earth's magnetic field.

There's a pervasive magnetic field in space that creates gigantic structures that you can't see.

But with a pendulum, we can visualize the invisible forces that make a magnet levitate.

My sculptures are usually pretty simplistic.

I try to strip away the superfluous and try to keep it very simple.

In the case of a painting, it can get quite complicated, I think, because the fields that support it can undulate and interpenetrate, creating interference patterns.

(Hockenberry) It's non-deterministic.

When you start drawing, you don't always know where you're going, even if you can calculate the force

How did this work develop? It's not the first time you've used a pendulum, is it?

Shannon: Yes. (Hockenberry) Right. TS: The first time we used a pendulum was in the late 1970s, it was a simple conical container with a cock.

I had to shake it to draw a trajectory, but it was only one color. Even after the pendulum stopped, the paint continued to flow, so I had to run to stop it immediately.I couldn't close the cock with the remote control.

I knew immediately that I needed a remote control device.

After that, I came to think that I could use 6 colors.

It's kind of like DNA, the primary colors red, blue, yellow, and white and black.

When you change these color combinations -- just like how the color pages of a magazine are printed -- and you change the amount of force you apply to the device, it rocks back and forth, shifts its trajectory, creates a trajectory, and creates a stunning picture.

(Hockenberry) Sounds like you're ready.

(Shannon) Yeah, let's actually draw it.

I asked my sons to prepare a canvas.

Let me introduce you to Jack and Nick and Louis.

(Hockenberry) Thank you very much.

(Shannon) So now- (Hockenberry) Yeah, we've got to move from here.

(Shannon) Now let's move the pendulum and paint the shoes of the person in front of us.

(Laughter) (Hockenberry) Oh, this is—

good condition

(Shannon) It's like this

Even if you're doing it as a demo, it's kind of like playing around, but you can use all of this in your work.

I'm going to keep improving the way I draw, layer by layer.

Set it aside for a few weeks, think it over, start working again, and move to another level, where everything you've been doing becomes the backdrop and adds depth to your work.

(Hockenberry) Great

The valve at the bottom of the tube is controlled like a radio-controlled machine.

(Shannon) Yes, it's a servo motor with a cam and a rubber tube.

If you pinch it tightly, the paint will stop, and if you open it wide, the paint will flow.

All colors come out from the center of the bottom

You can always change the color, aluminum paint or whatever.

I don't care if it's tomato sauce, anything that works - even sand or flour

(Hockenberry) There are many forces at work.

Gravity, centrifugal force and fluid dynamics also come into play.

They're beautiful paintings, but do you see them as images in themselves, or are they recordings of physical events, like a pendulum approaching the canvas?

CA: In the painting there, I wanted to do something very simple, a simple iconography of two interfering ripples.

I drew the right side first, then the left side overlaid on it.

I left a gap so that the lines I drew earlier could be seen

When I drew the second one, there was an uproar: the big blue lines bumping into each other, creating a kind of tension and overlap.

There's a line in front of the line on the right, and a line behind the line on the left, and they're in different planes.

This work is also a collection of small physical events that interpenetrate -- (Hockenberry) two stars, or rather (Shannon) -- two events occur -- patterns of mutual interference -- and a third event occurs.

The shapes that emerge are simply the connection of two things that are happening, and that's what I'm really interested in.

It creates patterns like the moire of printing.

The green piece over there, which I made about 10 years ago, has a moire pattern and an interference pattern about one-third of the way up, which looks like radio waves.

There is something there that I have never seen as a painting

I've never seen a work that shows a kind of radio wave interference pattern, even though those patterns are ubiquitous and an important part of our lives.

(Hockenberry) Is it part of the image itself or does my eye create the interference pattern - is the interference pattern completed by vision?

CA: It's the paint that actually creates it.

actually happening there

If you move the pendulum so that the circles or ellipses are concentric, you'll draw a steady stream of evenly spaced curves, which will become denser and denser, and you'll see how gravity works.

There's something very fascinating about the rigor of science, and I really enjoy it.

I like the shapes that come to light through scientific observations and instruments, and I'm particularly fascinated by the shapes that relate to celestial bodies and the vastness of the universe and its scale.

Over the last few years, my interest has shifted more towards biology.

If you look closely at these paintings, strange things appear, like horses, birds, crocodiles, elephants.

I can see many things

If you look closely, it's like looking at a pattern of clouds, and every now and then a clear, regular shape appears.

Yes, there are shapes that come up, but we don't know what they are, but they are still distinct and complex shapes.

These may be predictable

Because it has the power to create things that look like the creatures we know so well, but also create shapes that we've never seen before.

These kinds of shapes could be found beneath the surface of Mars, and there could be subterranean lakes with fish swimming in them.

(Hockenberry) No, I hope it is.

I really think so

And then, at this stage in your life, you find yourself dealing with some pretty troubling things, too. Electromagnetic forces are at work in Parkinson's disease, in creativity, and in both the artist you are right now and the life you take.

Does this relate to your work as well?

Shannon: When I try it, it works really well. It's hard for me to fine-tune my muscles, but if you're going to slide this lever, you can do it with your willpower.

As you watch the pendulum move, you decide whether you want more red, or you want more blue, or you want a different shape.

While making those creative decisions, there's a much easier way to do it.

I have symptoms

Parkinson's disease progresses with age, and symptoms appear at some point.

In my case, my left hand shakes a lot, so does my left leg.

I'm left handed and I draw with my left hand

My work starts with small drawings, and the way I do it is by drawing thousands of them and thinking about them.

I draw with a regular pencil, but at first the symptoms of Parkinson's disease really upset me. I can't hold a pencil still.

(Hockenberry) Worrying too much about that kind of power

I don't think I'm the master of that power

Rather, you say that you are a servant.

(Shannon) Nature is a gift from heaven.

is extremely rich

I think nature tries to express itself in the sense that we are nature and humans are part of the universe.

the universe is in our minds our minds are in the universe

We are basically expressions of the universe.

Humans are ultimately part of the universe, and we are a kind of spokesperson or observer, a constituent element of the universe.

We can use a device to interact with the cosmos, to manifest a ubiquitous force so that we can show what we can do. Give us paint, like an artist.

You are a great production assistant.

BH Hockenberry: That's a great idea. By adding precision movement and control to traditional techniques by your hand, you reveal fundamental power, and that's where the beauty lies.

thank you so much tom it was great

TS: Thanks John

(applause)

I'm going to talk about political corruption, but first I want to contrast two different things.

One is about the huge global economy, which is the huge globalized economy, and the other is about the traditional governments and international institutions that have very limited and small capacity to govern and shape the global economy.

Because this asymmetry basically corrupts governance.

Corruption in governance is happening in many areas: political corruption, environmental destruction, exploitation of women and children, climate change.

I think corruption, the fight against corruption, and the impact of corruption reveals what I call governance corruption in the most interesting way.

let me tell you my own experience

I was working in the World Bank office in Nairobi, responsible for East Africa.

At that time, massive corruption was systematically undermining our work.

So I wanted to not only protect the work of the World Bank, our projects, our own programs, from political corruption, but more broadly, we needed a mechanism to protect people in this part of the world from corruption.

As soon as I started this job, I got a notice from the World Bank, and it was a notice from the legal department, and it said, "You are not allowed.

I am trying to interfere in the internal affairs of a bank member country.

This is prohibited by the World Bank Charter and we demand that it be stopped immediately.”

At that time, for example, I was hosting a conference of donors, and there were different donors, and many of the donors chose to be in Nairobi, which is the worst city in the world.

And there are a lot of bad projects going on in the conference of donors, pushed by the clients of the World Bank, their governments and their promoters, and many of them are companies in the North that have realized those bad projects.

For example, a huge power plant project, a $300 million project, was being built in a very beautiful and vulnerable area in western Kenya.

We all realized that there was no economic benefit to the project, because no one was buying the electricity it generated, and no one was interested in the irrigation project.

And this project was an environmentally destructive project. It destroyed the riparian forests, which were the basis of nomadic subsistence. The Samburu and Tolkana tribes lived in this area.

Everyone knew that this was not only an unnecessary project, but a terrible project that would do great harm, not to mention the future debt of the nation, which would amount to hundreds of millions of dollars, and siphon the economy's scarce resources from vital activities like education and health care.

And all of us rejected this project, but none of the donors wanted to know that we had rejected it, and that was the first attempt to be put into action.

A good project is one that has been protected among its donor peers.

Bad projects, on the other hand, caused economic damage, caused generations of environmental damage, and forced thousands of families to relocate. Bad projects are suddenly shaped by federations of banks, minions of suppliers and insurance companies.

These companies are big companies now.

They're the characters in the global market, the first company I mentioned.

It's big companies like Siemens, French, British, Japanese, Canadian and German companies that are systematically driven to massive corruption.

We're not talking about $50,000 or $100,000 or $1 million.

What we're talking about is $10 million, $20 million, in Swiss bank accounts, in Liechtenstein bank accounts, which belong to ministers, to senior officials in semi-governmental companies.

This is the reality I've seen. There's not just one project like this. I dare say I've seen hundreds of projects like this in my time working in Africa.

So I believe that this kind of systemic corruption distorts the economic policies of developing countries, and it's a major cause of the tragedy, the poverty, the conflict, the violence, the despair in many developing countries.

More than a billion people now live below the absolute poverty line. More than a billion people don't have access to clean water. Twice that number, more than two billion people, are sick because of poor sanitation and poor hygiene. Child deaths, in particular, kill more than 10 million children under the age of five each year.

Why won't the World Bank let me do this job?

I found out later why, after I had a big fight and quit the World Bank.

World Bank members acquiesce in foreign bribes, and so does Germany.

In Germany, bribery to foreigners is allowed.

It's even tax deductible

Bribery is organized not only in Germany, but in France, in the UK, in Scandinavia, in the most important German international corporations, everywhere.

Most, but not all, companies

I call this phenomenon governance corruption. When I came to Germany and started this little NGO, they told me here in Berlin, at the diplomatic school in Billa Borsig, "You can't stop us from bribing our German exporters," because that's how you lose contracts.

Because we will lose to French companies, we will lose to Swedish companies, we will lose to Japanese companies.

There's a prisoner's dilemma there, which prevents individual companies, individual exporting countries, from saying, "I'm going to stop this absolutely awful practice of big corporations offering bribes."

This is what I call a corrupt government system. Not even a powerful government, not even a government like Germany, can declare that it will not tolerate foreign bribery.

They were asking for help, and the mega-corporations themselves are in this dilemma.

Many big companies don't want bribery.

For example, many German companies believe that they are really competitive by producing high-quality products at low prices.

German companies are not good at bribery. Many of their international competitors are good at bribery. German companies were unable to show their strength because the world was plagued with corruption on a massive scale.

That's why I want to say that civil society must stand up against this.

Our little NGO is called Transparency International

We're trying to find a way out of this prisoner's dilemma, and we've created the concept of Collective Action, which is basically trying to bring different competing companies to the table together. Tell them all how it would be in their interest to stop bribery at the same time.

In 1997, a pact was signed under the auspices of the OECD and all member states changed their laws to criminalize foreign bribery.

(Applause) Thank you. There was something interesting about doing this.

We had a conference here at the Aspen Institute in the Wannsee district of Berlin, and there were about 20 representatives from different industries, and we discussed with them the issue of international bribery.

We had a total of three discussions in two years, and in the first discussion

President von Weizsaecker chaired the first debate, alleviating the concerns of companies unaccustomed to doing business with NGOs.

At the initial discussion, the company said, ``We are not doing bribery.''

"Bribery is a cultural requirement," he said.

I even clapped when I said that

In fact, some people still say that today.

Many people still don't believe that bribery should stop.

But early on in our second discussion, we admitted that we would no longer bribe, and decided that we would not do the same things here in Germany, in the United Kingdom, and elsewhere that we do in other countries.

cabinet ministers accept

At the last meeting at the Aspen Institute, we got them to sign an open letter, which was addressed to the Kohl government at the time, demanding that they join the OECD agreement.

In my view, this is an example of soft power. We have been able to make them believe that they have to keep pace with us.

we take a long-term view

We're trying to protect a broad, geographically vast organization.

so the law was changed

That's why Siemens got in trouble and MIN got in trouble.

Other countries have not yet implemented the OECD agreement.

Civil society is still under the control of power.

In London, for example, BAE has been spared prosecution in a major corruption case, which the Serious Fraud Watch Office tried to prosecute, in which it gave 100 million pounds of gold each year for 10 years to an official of a friendly country, who bought 44 billion pounds of arms.

BAE has not been prosecuted in the UK in this matter

Why? Because the prosecution was seen as a threat to the safety of the British public.

The private sector continues to pursue and seeks to solve this problem. Neither the UK nor Japan has an OECD agreement in force, nor do other countries.

In Germany, we're pushing for the ratification of the UN agreement, which is the follow-on agreement to the OECD.

It has not even been ratified in Germany

why? Ratifying it would have to punish proxy corruption.

In Germany, it is not allowed to bribe officials, but it is allowed to bribe agents.

This is legal in German law, and parliamentarians don't want to change it, and that's why they won't sign the UN agreement against foreign bribery. Germany is one of the few countries in the world that preaches fairness and clean administration, but it can't ratify the agreement.

Because my time is about to run out

For the time being, let me state the conclusion based on what has happened so far.

We've achieved some in our fight against corruption, and we're trying to achieve it in other areas of corrupt governance.

The United Nations is now completely on our side.

The World Bank changed from Saul to Paul under President Wolfensohn. The World Bank is, in my opinion, the most powerful anti-corruption force in the world.

Most of the big companies now have clear policies against bribery and things like that across the board.

It can be done by private organizations working with businesses and working with governments to analyze problems, develop solutions, implement reforms, and then validate reforms.

Of course, if private sector organizations want to play that role, they have to be able to do that.

Not all private sector organizations are good.

The KKK is also an NGO

That's why we, too, need to be aware that private organizations need to take care of themselves.

Private sector organizations also need greater transparency in their financial discipline.

Greater participatory governance is needed in many private organizations.

We also need leaders in private organizations to become more effective.

That's why we set up a public administration school and a center for private associations in Berlin, because the majority of German and European educational and research institutions generally still lack the capacity and leadership of private associations.

But my practical experience is that when private organizations do this right and work with other organizations, especially governments and international organizations, they can work with large international organizations and enable those organizations to be socially responsible. And then this magic triangle -- the triangle of private organizations, governments and businesses -- creates a great opportunity for all of us to create a better world.

thank you

(applause)

Unfortunately, during the 18 minutes we're talking here, four Americans have died from food.

I'm Jamie Oliver and I'm 34.

I'm from Essex, England

For the last seven years, I've been trying my best to save people's lives.

I'm not a doctor, I'm a chef. I don't have expensive equipment, I don't use drugs.

information and education only

I strongly believe in the power of food at the center of our homes to connect us to the best parts of life.

The situation is very dire

America is the worst

one of the most unhealthy countries in the world

Please raise your hand if you have a child

please raise your hand

Auntie and uncle, please raise your hand.

most of the time it's fine

What the last four generations of adults have given their children is a shorter life expectancy than their parents.

Your children will live 10 years less than yours because of the food we feed them, two-thirds of Americans.

statistically overweight or obese

If you're not obese yet, you'll eventually become so, so don't worry. (Laughter)

Right? The data about poor health is very clear.

It's often reported in newspapers and on CNN.

But murder is the lowest

Right? (smile)

(Applause) All these red parts are food-related diseases.

Doctors and experts know

Food-related diseases are the leading cause of death in America today.

this is a global problem it's the worst

spread all over the world

Britain is close behind, as always.

(Laughter) We're not overtaking it yet, but we need to innovate.

Mexico, Australia, Germany, India, China also have obesity and ill health problems.

Tobacco problem is much cheaper than obesity

The cost of obesity to America is

10% of all healthcare costs $150 billion a year double in 10 years

expected to reach $300 billion annually

You don't have that kind of money, do you?

(Laughter) I came to America to start a food revolution.

now is the time

If you leave me alone, I'll be in big trouble.

all seven years

worked hard in America

Now is the time to act

I went to West Virginia, the state in the middle of the problem, the most unhealthy state in America—

that was last year's ranking

The worst this year is in another state, but next year I'll do my best there.

(Laughter) Huntington is a beautiful town in West Virginia.

I want to look at the individual people behind the statistics that we are all familiar with today.

Here are some of the people I care about, like your neighbors and your children, this is a picture of Brittany, who you've grown to love.

I'm 16 years old

She has six more years to live, and it's because of her diet.

I don't know how to eat right, I never learned how to cook at home or school, never from my mother or grandmother

I only have 6 more years to live

Eating kills your liver, this is Stacey from the Edwards family.

it's a normal family

She's not cutting corners, but she's also third-generation, so she hasn't learned how to cook at home or in school.

Justin, 12 years old, weighs about 160 kg

He's been bullied, his daughter Katie is four.

I've been obese since I didn't even go to elementary school.

Marissa is fine, just like you.

But my father, who had an obesity problem,

She died under her watch. The second most important man in her life, her uncle, died of obesity. Her stepfather was also obese.

The problem is that obesity and eating disorders don't just hurt you, they affect all your friends, your family, your brothers and sisters.

I'm Reverend Steve, my first collaborator in Huntington, West Virginia, and I'm in a position to see this issue up close.

He has to send the deceased out, he has to bury his friends, his family, his community.

I'm tired

Three times as many people die in winter

Enough is enough, this is a preventable disease, a waste of life.

This is the coffin used

this is hard

I can't even carry it out the door, seriously.

We have to use a forklift to transport our food.

Consists of home, school and shop

I hope you understand this

You probably know it, but I'll explain it briefly.

What has hurt this country in the last 30 years?

Let's be frank and honest, it's a modern way of life.

Let's start with the stores. Fast food has taken over the country.

The power of big brands is huge in this country, and so are supermarkets.

It's a big company

30 years ago, most of the ingredients were

Locally produced and fresh

Now it's mostly processed food, full of additives and superfluous ingredients.

The amount of food is also a big problem Food labeling is also a big problem

The representation of this country is terrible

This industry does its own screening.

We're doing regulatory control on the inside.

It's no use in such a trend

Touting something full of sugar as "low-fat" is absurd.

next is home

The biggest problem at home is that society used to be built around food and food culture.

Now that's a thing of the past, people are working outside the home.

We have to rethink the big picture as our lifestyles change. We have to step back and rethink the balance.

I'm going to show you

A family like no other, the Edward family.

(Video) Jamie: Let's talk, it's all going into you and your family.

every week

This is shortening a child's life expectancy.

What do you think?

Stacey: I'm just sad and depressed right now, but I want my kids to have a happy life.

But you can't do that because I'll kill you

Jamie: yeah

but it can be stopped

This is a normal family. Now let's look at the school.

It is also my area of ​​expertise.

school What is school? who invented it? What's your purpose?

The purpose of schooling is to foster creativity and teach future employment.

It's been based on this narrow definition for a long time, right?

It hasn't evolved much from there and hasn't addressed America's health problems.

School feeding means that 31 million children eat two meals a day, breakfast and lunch, 180 days a year. School feeding is very important.

Judging by the circumstances—

(Laughter) I know you're all waiting for me to vent my frustrations -- (Laughter) But before I do that, I'm going to tell you something very important. I hope the magic happens in the next three months.

I promise to be their ambassador

I am not blaming them for anything

they are working hard

I'm doing my best I'm doing what I'm told

what you said is wrong

It's a system run by accountants, and people with food knowledge are almost never involved.

That's the problem. If you don't know anything about food and you're on a tight budget, which has been the case lately, there's nothing you can do about it.

The only thing you can do in this situation is buy cheap bad stuff.

The reality is that what children eat every day is fast food, which is highly processed and contains very little fresh food.

The amount of additives and E-numbers is unbelievable. Even vegetables are completely lacking. Potato fries are a substitute for vegetables.

Pizza for breakfast, not even proper tableware

What about knives and forks? too dangerous

We have scissors in the classroom, but no knives and forks

If you can't use knives and forks in school, it's like ordering fast food at the local government level because you can eat it with your hands.

It's fast food, sloppy joes, hamburgers, frankfurters, pizza, and stuff like that.

10% of healthcare spending goes to obesity, double that.

not educating children

Elementary and junior high schools are not required to provide food education to children.

This is a video from an elementary school

A common sight in the UK

Video: "Anyone know what this is?"

Child: "Potato" Jamie: "Potato? Do you think this is a potato?"

"Do you know what this is?"

"Do you know what this is?" Child: "Broccoli?"

Jamie: "What do you think this is?"

Jamie: "Do you know what this is?" Kid: "Celery?"

Jamie: "No. What do you think this is?" Child: "Onion." Jamie: "Onion? No."

Jamie: You'll find out soon

Children don't know where their food comes from

Jamie: "Does anyone know this?" Child: "Ah pear" Jamie: "What do you think this is?" Child: "I don't know."

Jamie: If you don't know what it is

I don't even eat

(Laughter) Jamie: This is normal, both in the UK and in the US.

How do you think you can fix it? Two one-hour classes

We should give our children food education in school.

(Applause) I'd like to share with you a classic example of our problem.

A very basic thing: milk.

All children drink milk at school

Your child drinks milk for breakfast and lunch at school, right?

Two bottles of milk, most children do.

But milk isn't as good as it used to be.

I'm an advocate for milk itself, but someone in the dairy industry has discovered that if you pay someone somewhere a lot of money to put flavorings, colorings and sugar in the milk, kids will drink more milk.

(clap hands) Of course, there will be industries that will copy this.

The apple industry may also provide candy apples to encourage children to eat more apples.

You don't need to season the milk

There's sugar in everything, right?

i know the whole story of this stuff

It's in everything, even milk is no exception

It's kind of a modern problem.

One carton of our milk contains the same amount of everyone's favorite canned juice.

It has sugar in it. Kids drink this twice a day. Let me show you.

Each child consumes 8 tablespoons of sugar per day.

this is for a week

this is for a month

I've collected five years' worth of sugar consumed in elementary school here, just the amount in milk.

I don't know about you, judging by the circumstances, if you look at the statistics and the evidence in courts around the world, any government that allows this to happen will be charged with child abuse.

I think so. (Applause)

If I were here today to announce a cure for AIDS or cancer, people would be racing to hear what I have to say.

What's different about this problem is that it's preventable.

this is a pleasure

It's totally preventable. We have a problem.

I need a brain switch What in the world do I need to do?

Here's the problem: you can't just do it in one place, to refresh your mind and make a tangible change.

I can look you in the eye and say, 10 years from now, if you eat right, you'll live longer, and your children's lives and happiness will change.

We all do a lot of shopping at the supermarket

every week

How much will you spend at the supermarket in your lifetime?

You can get anything you want at the supermarket

I would like to see food ambassadors placed in all supermarkets.

they help with shopping for busy people

I'll teach you how to cook delicious, seasonal dishes that are quick and inexpensive.

done in several places

Across the United States needs to do it now

Big food brands should put food education at the heart of their business

It's not as easy as it sounds

But it's the only way to the future

the fast food industry

It's very competitive and I'm in fast food

I've seen tons of confidential information and deals, and I know what to do.

The fast food industry makes us dependent on sugar and salt and fat and other things.You love fast food, don't you?

So they are also needed for problem solving

First, governments need to get the food and beverage industry out of its addiction over the next five, six, seven years to the sheer amount of fat and sugar.

Now, when it comes to big brand food labeling, as I said before, it's all bullshit. We have to do something about it.

Schools, of course, have an obligation to their students 180 days a year to prepare and serve fresh, local ingredients, from the sweetest 4-year-old to the age of 18, 20, 24 or so, of fresh, proper meals for children.

We need standards. (Applause)

Under these circumstances, it's important that every American child learn 10 recipes that will help them survive by the time they graduate.

is a life skill

(Applause) So, whether you're a student or a young parent, if you can apply the basics of cooking in many different ways, whatever the next depression.

It's okay, if you can cook, time won't matter.

I didn't mention the workplace.

It's time to figure out what corporate responsibility is giving to employees.

Employees are the mothers and fathers of America's children.

Marissa's father died holding her hand, and she will be rewarded if American companies start feeding their workers decent food.

Businesses shouldn't be left behind. Back to home.

Everything can be done, and it can be done commercially with consideration

Is possible

But it's essential to start cooking at home.

It's about communicating values, which might sound idealistic.

If one person teaches three people how to cook, that person teaches three friends how to cook, and in just 25 repetitions, it's all over America.

Call it idealism, but the most important thing is that each person's effort makes a difference.

It's something everyone realizes. We have to get back what we lost.

Huntington Kitchen, where the show takes place

It aired in prime time and I hope it makes a difference for people.

I believe change happens, and I work with the community here.

work in schools and find sustainable funding locally

We're moving every school in our area from junk food to fresh food. $6,500 per school.

(Applause) That's it. $6,500 per school.

It costs $25,000 a month to maintain the kitchen, and that's enough to educate 5,000 people a year.

10% of the city's population Person to person

local cooks teach locals

A free cooking class on the main street

this is a real substantive change

Everywhere you look in America, there are so many great things happening.

there are so many beautiful things

All over America, there are donors working, from farms to schools, farming arrangements and education, some amazing people are already working.

The problem is that they want to take what they're doing to the next school, but they don't have the funding to rush to find experts and supporters.

We should help them to more easily deploy what they're already doing.

That's what Mrs. Obama is trying to do.

(Applause) It's strange that an Englishman would say this to you here.

But I have an interest and I'm a father

I love this country, I truly believe that

If there is a change in this country, the whole world will change, if America does-

other countries will follow

very important

(applause)

When things went wrong in Huntington, "If only I had a magic wand

what would you do? thought, "America's finest

I want to stand in front of these powerful people." A month later, TED called me to accept this award.

I am here

So my TED wishes—

I'm dyslexic, so please excuse my slow reading

My hope is that all children will be properly educated about food, and that you will help us to reinvigorate our families and empower them to fight obesity.

(Applause) Thank you.

(applause)

About a year and a half ago, I was selected as the architect of Bing Maps, an online map that Microsoft is working on, by Stephen Lawler, who gave a talk here at TED in 2007.

You've worked hard over the last two and a half years to redefine how online maps work.

I think we've been able to create something very different from the map sites and navigation sites that existed in the past.

The first thing you'll notice when you look at this map is the fluid expansion and pan movement. You may know Seadragon, this uses that technology.

Of course, maps aren't just maps, they're images.

If you expand beyond a certain resolution, you can see a 3D map like SimCity from a 45 degree angle.

All exteriors and 3D structures can be viewed from any direction, north, south, east or west.

Now, we think of this 3D virtual space as a blank canvas on which all kinds of software can run. And directions are just one part of it.

Click here to see some of the software we've added over the past few months.

For example, a few days after the Haiti catastrophe, we had what we call a seismic map that showed satellite images before and after the earthquake.

I can't show you today due to time constraints, but this awesome feature will access your local blogs in real time and show you the entries that have posts on those blogs on a map where they are mentioned.

Amazing, right?

But for now, let me show you a few things that might give you a little more fun.

The pictures you see here are not just satellite pictures.

This little green grain is Photosynth made by a user. this and more

I won't go into it in depth, but it embeds Photosynth data into the map.

Areas surrounded by blue are areas that have already been photographed on the ground.

So you go down there -- (Applause) Thank you. When you go down to the ground, you will see a panoramic image like this. The first thing you'll notice is that this isn't just a photograph, it's a three-dimensional view of the environment, just like you were able to see a 3D image from above, even at ground level. So let's click on something to get a closer look. Based on the 3D model and geometry, movement is done as if you were actually in a 3D world.

Here's an interesting one we've created in collaboration with Flickr users.

We import images registered on Flickr and link them to our 3D map in the manner of Photosynth. So -- I'm not sure if this is what I was going to show you... ("My father was killed by a ninja. I need money for karate lessons." -- laughter) This is a famous tourist destination, and there are a lot of pictures here, all taken at different times.

Look, this was taken at about five o'clock.

This is the Flickr photo, the source of our images.

So you can actually see that these images are deeply integrated into the map itself.

(Applause) Thank you.

(Applause) This technique is interesting for several reasons, and one of them is definitely time travel.

I can't show you it right now due to time constraints, but I have some historical photos of horses and carriages.

By the way, what's amazing about this is that it not only improves maps with images provided by general users, but also serves as the basis for augmented reality. I'll show you a little more detail later.

I tried moving inside the building. This is interesting too.

Look, there's a roof over here.

We are now inside Pike Place Market.

This is made possible by backpack cameras. So we're not just taking pictures of the outside through cameras on top of cars, but we're also taking pictures of the inside.

And we can register not only still images but also videos in the same way.

So this is what we're trying to do in real time for the first time right now, and I'm really worried that it will actually work.

(Laughter) Let's get started.

(Beep) Are you all right, are you here already?

(noises) Oh, I'm doing it now. Let's start the demo.

Oh I'm on stage All right. don't come

Here's a video from our folks at Pike Place Market.

(Applause.) They're broadcasting in real time right now.

Okay George, can we go back to the edge of the market?

I want to show everyone what I recommend.

It's not the other way around, it's the other way around.

That's right. go back to the edge. edge.

You guys don't have to show up yet.

Was found was found. go back to the edge. Edge edge.

No more, nothing.

The recommendation I wanted to show you is the red dot at the top of the image, because it gives you a sense of how it works if you're actually in this place. Think about it. This is a step further than augmented reality.

What are you guys doing--Oh, I'm sorry.

(laughter) We're two different... OK, let's hang up.

We are doing two different things here.

One is real-time...

(Laughter) So I'd like to take a moment now to thank the whole team.

They did a great job in making this demo a success.

(Applause) I'd like to say goodbye to them and head back outside.

And while I'm walking outside, I would like to mention that while we've used this for telepresence now, it's perfectly possible to use this for augmented reality locally as well.

Using this locally means that you can retrieve all the metadata and information in the world at your fingertips.

Here we take it a step further and broadcast.

By the way, the footage from the market earlier was transmitted over a 4G network.

Now, the most recent TED talk Microsoft has given in the last few years is

Curtis Wong's WorldWide Telescope.

Now we are heading towards the garbage dump. It's where you go to rest after a long day at the market or to look up at the sky.

This is the WorldWide Telescope integrated into our map.

(Applause) This is the current -- thank you -- this is the current image, but if you move the time bar, you can see different skies at different times of the day, and then we can see all the detailed information for all the different times and dates. Let's go a little higher up and look at the moon. Should I change the date as well?

I would like to zoom in a little on the moon.

This is what the sky looks like in astronomical perfection. One with our map.

Well, we're running out of time, so let's stop here.

thank you very much.

(applause)

I'm going to talk today about energy and the climate.

This might come as a bit of a surprise, because my foundation's main work is in things like vaccines and agriculture, areas that need investment and help to improve the lives of the two billion people who live in poverty.

But energy and weather also have a big impact on the poor, and it's the poor who are most affected.

If the weather turns bad, they won't grow crops for years. Too much rain, not enough rain.

There will be famine, there will be chaos and strife.

So climate change poses a threat to the poor.

The price of energy also makes a lot of sense.

If I could reduce the price of just one thing and reduce poverty, it would definitely be energy.

Energy prices are declining over time

Indeed, advanced civilization is based on advances in energy.

The Coal Revolution ignited the Industrial Revolution, and already in the 1900s, the price of electricity was falling precipitously, which is why we can use refrigerators and air conditioners, create new materials, and do many things.

In an affluent world, electricity provides a wonderful environment.

But when the price goes down - let's say we cut the price in half - we face another constraint, the limit on CO2.

CO2 heats the planet, and the equation for CO2 is pretty straightforward.

Accumulation of CO2 emissions leads to rising temperatures. Rising temperatures do some very nasty things. Climate, of course, and perhaps the worst direct, invisible effect is the inability of natural ecosystems to respond to rapid change, and it forces ecosystems to collapse.

We've pretty much figured out how much temperature rise a given amount of CO2 equates to, and even if there's a lot of uncertainty about the exact relationship and how positive feedback works.

I don't know for sure how bad it will be, but it's certainly a big one.

I've asked a few brilliant scientists whether it really needs to be zero.

Is half or 1/4 no good?

The answer was that the temperature will continue to rise until it approaches zero.

this is a big challenge

It's not like a 12-foot truck going through a 10-foot bridge, you just have to dig under it.

must be zero

Every year, we emit tons of carbon dioxide -- more than 26 billion tons.

20 tons per American

less than a ton in poor countries

If you average the whole earth, it will be 5 tons per person.

We have to somehow change the situation, we need to get closer to zero.

Emissions have continued to rise

The only thing that could limit the increase was the economic factor, which means that it had to go from a steep rise to a decline and continue to fall to zero.

There are four variables in this equation that need multiplication.

On the left is the CO2 that we want to reduce to zero, and that amount is determined by the number of people, the amount of service per person, the amount of energy per service, and the CO2 emissions per unit of energy.

Let's look at each quantity and figure out how we can make it zero.

One of the numbers should be near zero

It's like a high school algebra class

please be patient

First is the population

The current world population is 6.8 billion.

increase to about 9 billion people

But with new vaccines, health care, reproductive success, we could probably cut that by 10 to 15 percent.

But now we're looking at an increase of 1.3.

the second variable is the service

Food, clothing, television, heating, everything is included in the service

everything is great

Getting out of poverty means making services accessible to everyone on the planet.

It's great to see this number increase

Wealthier countries, perhaps the top billion people, could use fewer services, but on average every year this number would increase, and the amount of services allocated to each person would more than double.

It's a basic service.

But not these kids, they're outside doing their homework by the streetlights.

Then efficiency, E, is the amount of energy per service, and there's good news in that regard.

it is not rising

There are many inventions in lighting, new ways of lighting, new types of cars, unconventional ways of building, and many services that can significantly reduce energy requirements.

Some services can save up to 90%

But on the other hand, there are some services, like fertilizer production and air transportation, where there is little room for reduction.

But if you're optimistic, you should be able to reduce it to 1/3 or maybe 1/6.

But these first three variables alone would, at best, cut 26 billion tons to 13 billion tons, and we can't hope for much more.

Now let's consider the fourth variable, which is the key variable, the amount of CO2 emitted per unit of energy.

The question is whether this number can be brought closer to practically zero.

Burning coal is no good

It's no use burning natural gas.

Current methods of power generation emit CO2, with the exception of new renewables and nuclear power.

So what we need now is to create a new system on a global scale.

In other words, we need a "miracle" energy.

A "miracle" is not impossible

A microprocessor is a miracle A personal computer is also a miracle

The Internet and its services are also miracles.

we have created many miracles

There's usually no deadline, there's no set deadline by which the miracle must happen

There are things that improve and things that don't, and it's normal to just wait and see.

But in this case, we have to go full steam ahead, we have to work miracles on a tight schedule.

How can I express myself better?

What kind of natural landscapes and demos can you show to spark people's imaginations?

I remember a year ago when I brought mosquitoes.

(Laughter) I hope you've thought a lot about the fact that some people live with mosquitoes.

Regarding energy, I brought this

I decided that releasing fireflies would be my contribution to the environment this year.

I brought wild fireflies

They say it won't bite you, but it might stick to the bottle.

(Laughter) I've put together a bunch of clever solutions, but they're not very convincing.

There's not necessarily one solution, but it's very large.

It has to be very reliable. People are trying to go in a lot of different directions, but I think there are only five things that can make a big difference.

waves geothermal nuclear fusion not including biofuels

I think we can expect some contribution, and if it exceeds expectations, it's better than that.

But what I want to talk about here is that we have to focus on these five, and we can't give up on one just because it looks tough, because they all have big challenges.

First, let's think about the use of fossil fuels: burning coal and natural gas.

It may seem simple to do, but it's not.

We have to take all the CO2 out of the chimney, pressurize it into a liquid, and store it somewhere.

We're piloting this process at the 60% to 80% level.

But to reach 100%, you have to work hard.

Another challenge is agreeing where to store large amounts of CO2. Probably the most difficult is that it's a very long-term problem. Who can guarantee that?

Who will guarantee billions of times more waste than nuclear and other conventional waste?

That's how much

it's a very difficult challenge

What about nuclear power?

Nuclear power also has three big problems. It's very expensive, especially in highly regulated countries. And safety, if it's not a problem, it can't be better.

How should we dispose of the waste?

It's not a lot of waste, but it's a big point of concern.

I need to dispel this concern

These three are difficult problems, but they should be solvable, and we need to work harder.

The remaining three are summarized

It's often called a renewable energy source.

The reality is that these are great because they don't require fuel, but they also have a downside.

First, the energy densities that can be harvested with these technologies are significantly lower than with power plants.

It's an energy farm, and it's going to take a lot of space, thousands of times more than a power plant that you would normally think of.

Nor is it a stable source.

The sun doesn't shine all day every day, and the wind doesn't blow all the time.

If you rely on any of these sources, you'll have to find other ways to get energy while it's unavailable.

a big cost issue

There's also the challenge of transmitting energy, for example, if the source is outside the country, not only do we have technical challenges, but we also have to consider the risks of getting energy from abroad.

There are also storage challenges.

To examine this problem, we looked at all types of batteries, for automobile computers, for portable batteries, for flashlights, and so on, and compared them to the amount of power that would be needed on a global scale.

All the batteries currently available cannot supply the required energy for 10 minutes.

So we need a dramatic technological breakthrough, one that can improve storage capacity by a factor of 100 compared to the approach we're taking today.

It's not impossible, but it's not easy

20% to 30% of your need would be the upper limit if you get energy from unstable sources.

100% dependability requires an amazing "miracle" battery.

So how do we proceed? What's the right approach?

Is it the Manhattan Project? How can we achieve our goal?

We need a lot of companies, maybe hundreds, to tackle this problem.

At least 100 people need to work on each of the five methods.

A lot of people will say it's crazy, and that's okay.

Also in this TED group

There are many people who are already moving in this direction

One of the companies that Bill Gross has is eSolar, which has excellent solar technology.

Vinod-Khosla has investments in dozens of companies that are doing great business and have potential in the future, and I'm working with them.

Nathan Myrvold and I are backing a company that, you might be surprised, is taking a nuclear approach.

There were technological innovations in nuclear reactors, such as the modular type and the cooled type.

Innovation has long stalled in this industry, so the idea that good ideas are being neglected is not out of place.

Terrapower's idea was that instead of burning a fraction of the uranium, the 1% U235, let's burn the remaining 99% U238.

it's a crazy idea

This approach has been around for a long time, but we haven't been able to accurately simulate whether it works or not. With the availability of modern supercomputers, we were able to simulate it, and it turned out that the right fuel approach seemed likely to work.

Using 99% as fuel provides dramatic cost savings.

What we're burning is waste, and all the residual waste that existing nuclear reactors can produce can be used as fuel.

Instead of worrying about waste, use it. It's a great way to do it.

It takes in uranium and burns it, kind of like a candle.

There's something like a log called a traveling wave reactor.

On the fuel side, this is the solution.

This photo was taken in Kentucky

It's a residue that's 99 percent, and it's called depleted uranium because the portion that can be used as fuel has been removed.

can supply America with energy for hundreds of years.

Just by filtering seawater in a cheap way, we can get enough fuel for the planet to live forever.

There are many challenges, but this is just one of many ideas that we should promote.

How should I rate myself?

How should I make a communication book?

Let's think about the end goal first, and then look back at the middle ground.

We often hear the expression 80% reduction by 2050.

This is very important and what we are aiming for

The remaining 20% ​​will be used up in poorer countries, there's also agriculture, and I think we've sorted out the forestry and cement issues.

So to reach 80%, developed countries, including countries like China, would have to completely change the way they generate electricity.

To further improve our performance, we are rolling out our zero-emissions technology, which means that we have completed the rollout of the technology in all developed countries and are rolling it out to other countries.

this is very important

It becomes the point of view of the report card

Looking Back What should your 2020 report card look like?

There should be two elements

We need all of these efficiencies to make progress in reducing emissions, and if we reduce our emissions, we can reduce our total CO2 emissions, and we'll have lower temperatures.

But doing something that doesn't lead to a significant reduction in our assessment is less important than in the other assessment, and that's the various innovations that belong to the breakthrough.

These breakthroughs have to go full steam ahead, and you'll be able to measure their success by how companies, test programs, regulations, etc. have changed.

There are many great books about this

Al Gore's 'Our Choice' David McKay's 'Sustainable Energy Without the Hot Air.'

Their serious work has created a framework, and this framework should be widely discussed, because it needs broad support.

there's a lot to do

it's a wish

By making a specific wish, this technology was born.

If I had only one wish in the next 50 years, would it be the nomination of the president? Would it be my calling: vaccines?

A very powerful choice

If we don't hope for this, the gap between short-term thinkers and long-term thinkers will continue to widen between the United States and China, between the poor and the rich, and the lives of two billion people will get worse.

So what should we do?

What should we promote?

Need more research funding

When countries come together in places like Copenhagen, they can't just talk about CO2.

We should discuss the innovation agenda

You'd be appalled that spending on innovative approaches is so low.

We need market incentives, like carbon taxes and cap-and-trade, and signals should be sent by prices.

you have to send a message

We need to make this dialogue more rational and understandable, including the steps governments are taking.

This is a very important wish, and I'm sure it will come true.

thank you

(Applause) Thank you.

Chris Anderson: Thank you Thank you

(Applause) Thank you. I'd like to learn more about Terrapower.

First, what is the size of your investment?

Bill Gates: Developing software, buying supercomputers, we're done hiring the best scientists, they only cost tens of millions.

Once we can test the materials in a Russian reactor, it should be clear that there's no problem, and that's still hundreds of millions.

The challenge is building a test reactor, which will require billions of dollars, find a watchdog, a site, and actually build the first one.

Once you build the first one and find that it lives up to its claims, it becomes clear, because the economics, the energy density, is completely different from any known nuclear reactor.

CA: Am I right in understanding that you have a column of spent nuclear fuel and uranium that is set up vertically deep in the earth? And does the process start at the top and continue down?

BG: Yes, current reactors require constant refueling.

A lot of people have complex controls, and mistakes happen, like opening a container, moving it around, and putting things in and out, which is bad.

If you have cheap fuel that lasts for 60 years, think of it as a log, just leave it there, without the traditional complexity.

It burns for 60 years and eventually dies.

CA: A nuclear power plant as a waste disposal solution.

BG: Yes, there's much less waste, so you can just leave it there, and you're actually going to take the waste out and replace it with the next fuel.

The first fuel is the waste that already exists, the waste that's in the cooling pool or the dry cask, so it's the first fuel.

The things that have always been a problem in conventional reactors are now being fed into our reactors, and this process should dramatically reduce waste.

CA: I think you've talked to people all over the world about the possibilities of this approach.

Which countries showed the most interest in actually doing this?

BG: I haven't picked a specific location yet, anything with a nuclear name comes with weird disclosure rules.

many people show interest

I am meeting with people from companies in Russia, India, and China.

I was able to meet with the Minister of Energy here, and we talked about whether this approach would fit in with our energy plans.

So I'm optimistic. French and Japanese companies are already responding.

It's an improvement on what has been done so far.

We've made tremendous progress, but it's the same as fast reactors, which are already being built in many countries.

CA: How do you see the timeframe and potential for realization?

BG: We have to build advanced power plants very cheaply. It takes 20 years to develop and 20 years to spread.

We have to meet that deadline, which is guided by the environmental model.

If Terrapower works, it will be easy. I hope so.

And fortunately, there are dozens of companies working on it now -- and I hope there are hundreds -- and they should be good competitors as well, if their technology succeeds and their testing facilities are well funded.

If many companies succeed, they can take advantage of it and use it.

one must succeed

CA: Things can change dramatically over the long term. What else is your biggest concern?

BG: The energy revolution is the most important thing

Even if it weren't for the environment, that wouldn't change. The environment simply makes the energy revolution even more important.

There are other innovators in the nuclear field.

I don't know if they're doing as good a job as we do, but there are people who are modular and taking a different approach.

There is also a cooling type, but it seems difficult.

There are many different types of nuclear reactors, but the cool thing is that a molecule of uranium has a million times more energy than something like coal.

If we can overcome the downside, which is the radioactivity issue, in terms of environmental impact, cost, efficiency in terms of land use, etc., it will be unmatched.

CA: What if things go wrong?

Should we consider any emergency measures in an attempt to stabilize the temperature?

BG: That situation is like eating too much and having a heart attack.

what should I do? you may need heart surgery

There's a line of research called geoengineering, where there are various techniques to slow down the thermal effect, and it'll give you 20 or 30 years of time.

This is a form of insurance, hopefully if you don't need it.

Some people say that it's better not to have insurance because you have insurance, you keep living idle and you keep eating because you think heart surgery will save you.

Given the magnitude of the problem, it doesn't seem like a good idea, but we should also start talking about geoengineering, because things could get worse faster than we expected, and technological change could happen later than we expected.

CA: Do you have anything to say to climate change skeptics? Can you convince them that they are wrong?

BG: Unfortunately, I'm in a completely different position than the skeptics.

Few people have scientific discussions

Are you referring to the negative feedback effect of the cancellation being done by the clouds?

Isn't it difficult to say that there is a one-in-a-million chance of something like that happening?

The main problem is the same as with AIDS: if we make a mistake now, it will cost us in the future.

If there's a lot of pressing issues, the idea is to be patient now, even if it's not clear how much, if it's going to be an advantage later.

The fact is, IPCC reports don't always assume the worst. The rich people of the world know the IPCC, and they can say, no fuss.

We act because there is uncertainty

My dream is, if this is economically rational and we can get past the CO2 constraint, the skeptics will say, OK, I don't care if we don't emit CO2, but we can emit a little.

The price is lower than before, so I don't think it's a problem

(Applause) CA: I think it answers Björn Lomborg's logic, which is that he said that if we put all our resources into the CO2 problem, we won't be able to achieve all the other goals, like poverty and malaria, and it would be a silly waste to spend money on this problem when there are other things we can do.

BG: In fact, the United States should be spending $10 billion more a year on R&amp;D than it is today, which is not surprising.

not at the expense of other things

You're investing in something that has no economic value, so I can understand why sensible people would object.

The goal is very close, and the investment that follows the learning curve will drive the price down.

This trade-off, if the price of energy went up, wouldn't matter to rich people.

People here should be able to pay five times as much and still have the same lifestyle.

The problem is 2 billion people

In that the discussion about R&amp;D does not increase

Lomborg is changing the subject

From his point of view, he's more of a skeptic, but he understands that there's not a lot of support, so he takes issue with R&amp;D.

I also have a point that I think is appropriate

Lack of funds invested in R&amp;D

CA: So, on behalf of everyone, Bill, I hope your wishes come true. Thank you.

BG: Thank you

(applause)

Someone once said, "Politics is show business for ugly people."

I can say that I have already succeeded in that regard.

Another thing I'm proud of as a politician is to be able to give a TED talk here in England, where politics has been tarnished by financial scandals and stuff like that.

Recently, scientists are even talking about using politicians as substitutes for lab rats.

And when asked "why?" the scientists said,

"Well, there are too many politicians, and no one cares what happens to them, and some things even rats don't do."

(Laughter) Now, we all love data, so let's start with a data-rich slide.

I think the most important fact in British and American politics today is simply that there is no money.

we have a huge amount of debt

This is my "global bond clock," and as you can see, it's over $32 trillion and growing.

What this clock shows us is very simple: the most important task facing our politics from now on is how to improve the situation without wasting money.

Because right now, we don't have enough money to improve public services, governments, and other issues that politicians are arguing about.

In such a situation, if you cling to the idea that everything depends on money, that the success and development of public services in health, welfare, education, and public security require money to be poured into it, the results will be disastrous.

But when you think about all the other things that affect the well-being of a nation, like family relationships, friendships, communities, and values, it's pretty interesting to be involved in politics right now.

So what I'd like to share with you tonight is a really simple and straight forward statement. I'm sure most of you know that the incredible information revolution is taking place, and I think that if we match the political philosophy and the way of thinking to match it, we have a great opportunity to actually reshape politics and rebuild government and public services, and we can greatly improve the well-being of our lives, as you can see on this slide.

that's tonight's topic

Let's start by talking about political philosophy.

But I'm not saying that the Conservative Party has all the answers.

actually we don't have all the answers

But fundamentally, I think there are two things that drive the Conservative Party, and that have a lot to do with tonight's theme.

First of all, we believe that if we give people more power and control over their lives, give them more choices, give them more control and let them take charge, we will actually become a stronger and better society.

And if you combine that fact with the information that is flooding the world right now, as I said earlier, I think we can rebuild politics, government, and public services.

The second has to do with human nature.

I believe that the only way politics and politicians can succeed is by striving to treat the people as they are, rather than assuming an ideal people.

I believe that if we combine this simplistic, conservative, humanistic view with the latest advances in behavioral economics, including some of the hottest ones, we can achieve notable improvements in well-being and well-being and healthier societies without wasting our budgets.

Now let me tell you why I'm having this argument "now."

I'm sorry to have to give you a brief, condensed history, but I believe that political history can be broadly divided into three parts: the pre-bureaucratic era, the bureaucratic era, and the post-bureaucratic era where I think we live today.

To put it more simply, we've gone from a world of local politics to a world of centralized power, and now we've arrived at an era where people control politics.

local power central power and now people power

Now this is King Canute, a king from over a thousand years ago.

I thought I could stop the incoming waves, but I couldn't

In fact, it wasn't a big deal, because a thousand years ago, in the time of the kings, it still took hours and weeks just to traverse your own country, and there was little you could grasp or manage.

At that time, the king did not manage public order, justice, education, medical care, welfare, etc.

I could do nothing but start a war

This was before the bureaucracy, when everything had to be done locally.

Due to the inconvenient transportation and the lack of nationally available information, it had to be managed on a regional basis.

This is before the bureaucratic era.

The next historical fact lesson is a glorious picture of the British Industrial Revolution.

All of a sudden, transportation became easier, we could travel, we exchanged information, and we started what I call the era of bureaucracy.

And this slide should change nicely... oh yeah

Suddenly a powerful centralized state was born

We've been able to manage health care, educate, maintain public order, organize the judiciary, and that's all.

And as I said, this is centralization, not decentralization.

The central authority absorbed all local power

Everything could be controlled centrally.

The next era is the massive information revolution that we all know so well.

Think for a moment, 100 years ago, it cost me 50 dollars to send those 10 characters.

But now we're connected from Long Beach to everywhere else, even in secret places, for a fraction of the cost, and we can send and receive large amounts of information without paying a dime.

So we're living in a post-bureaucracy era where people really have power.

So what does this mean for our politics, our public services, our governments?

We can't give many examples in this limited amount of time, but let's think about some of the ways in which our lives are affected.

The impact is clear when you consider how it has changed the way we shop, travel and do business.

These things have already happened, and the information and internet revolution is present in every corner of our society, but it's not permeating government in every way.

so what should i do

I think there are three main approaches that can bring about big change: transparency, greater choice, and accountability.

On the subject of "transparency," I have one of my favorite websites: the Missouri Accountability Portal.

In the old days, only governments had control over information, and only a select few could see it, ask questions, and challenge it.

But on this American state website, you can search and analyze and check all the taxes that the state government has spent.

Think about how big a change this could mean. Any company that wants to bid on a government contract, such as a public works project, would know what their current budget is.

Anyone who thinks they can do a better job, or can do it cheaper, can get the information here.

But compared to what's happening in business based on the information revolution, in government and politics, it's just getting started.

That's why if true "transparency" is realized, the impact is immeasurable.

In the UK, if we the Conservatives win the election, we're going to put all government spending above £25,000 online for anyone to check.

And today, for the first time, we will make the terms and conditions of every government order available to everyone on the Internet.

Now about choice. These days, we do everything online, whether it's shopping or comparing products, but the revolution in public services, whether it's education, health care, or public security, is still very much on the surface.

I think we should take advantage of the information revolution in our country to make this change, for example, searchable medical websites, such as surgical results, information about doctors, hospital hygiene information, which hospitals have the best infection control, and other information that was previously available only within the ministry of health, and is available to the public.

The third point is about accountability.

I think this is a pretty big change.

It's a "crime map." This one's from Chicago.

For example, thanks to this system, because we have information about where and what crimes are being committed, we can use this system to improve the situation where we have to use government personnel to hold the police accountable, and based on this information about when, where, who committed what kind of crime, citizens can quickly have the power to hold the police accountable.

There's a blue icon here that looks like a toque, and it's an assault case.

This way you can see what crimes are happening where, and at the same time you have the opportunity to hold the police accountable.

In this way, "transparency," "accountability," and "expansion of choice" bring about big changes.

Now, I talked about another philosophy earlier, that we need to understand people and recognize that if we take human nature into account, we can accomplish much more.

Now we're witnessing revolutionary advances in human behavior, and this is also an opportunity to make that knowledge and information more versatile.

We are collaborating with some behavioral experts

I've been advised by such experts to try to clarify the causality of everything.

Let me give you a very clear example that I like.

We want people to live more energy-saving lives.

Because by doing so, we can lower our utility bills, and at the same time solve fuel shortages and reduce carbon emissions.

How do we make it possible?

Over the years, governments have campaigned to raise awareness and encourage people to turn off the lights in their homes when they leave the house.

A minister once said that you don't need to turn on the light to brush your teeth.

I hope it didn't last too long

But look at this, this is very simple behavioral economics.

The most effective way to reduce your electricity bill is to show how much you're currently paying, how much your neighbors are paying, and how much the 3044 energy-conscious people are paying.

This kind of behavioral economics can change the behavior of people who never changed, even when governments nudged them, they cried out, they warned them.

Another example is recycling activities.

We all know we have to recycle more

But how do you actually recycle it?

In fact, it's been demonstrated in the United States that if you pay people to recycle, you can actually change people's behavior by giving them candy instead of whips.

So what do these mean?

These are my two favorite American speeches of the last 50 years.

First of all, we all know the simple and powerful speech of John F. Kennedy, "Ask not what your country can do for you, but what you can do for your country."

But really, when Kennedy gave this speech, what could have been done to create a better, healthier society?

I could have fought for my country, I could have died, I could have worked for my country as a civil servant, but in those days we didn't have enough information and knowledge to build a healthier society like the one you have now.

So I'd like to read to you a portion of a speech that's even better than J.F. Kennedy's speech. This speech by Robert Kennedy, as I said at the beginning, is that life isn't all about money, and there's more to weigh on it than money.

It brilliantly explains how the GNP captures only a fraction of the truth. The GNP "does not take children's health into account, nor does it include the quality of education or the enjoyment of play."

"It shows neither the beauty of poetic expression, nor the true worth of a couple, nor the intelligence of public debate."

"The GNP does not measure our wit, our courage, our wisdom, our learning, much less our patriotism or even our mercy."

“GNP ultimately shows nothing but what gives life meaning.”

It's also a beautiful statement 40 years ago, a beautiful ideal 40 years ago. But today, we have the incredible advances in information technology, the dramatic changes in economic behavior, and the knowledge that drives well-being. If you combine those insights, understand what drives people to act, and understand human nature, use information, and empower people, the ideals of that wonderful speech 40 years ago are now within our reach.

thank you

(applause)

I'm going to tell you what I discovered when I was writing an article for a magazine a few months ago.

I always keep a thesaurus by my side, but at that time I realized that I had finished writing and had never looked up the synonyms of disabled.

read the headings

Disabled—adjective ``disabled'', ``helpless'', ``useless'', ``disabled'', ``stuck'', ``wounded'', ``injured'', ``mutilated'', ``lame'', ``mutilated'', ``infirm'', ``tired'', ``weakened'', ``incapacitated'', ``castrated'', ``paralyzed'', ``disabled'', ``dull'', ``aged'', ``cannot work'', ``finished''. ``defeated'' ``exhausted'' ``defeated'' ``excluded'' See also: ``damaged'' ``useless'' ``weak''

Antonyms: "Healthy", "Strong", "Capable"

As I read it to my friends, I laughed at first, it's silly, but after reading "I was cut off," I burst into tears and needed time to calm myself down from the emotional shock and shock from the attack that the words wrought.

I thought it must have been a long time ago because it was a worn out thesaurus.

It was published in the early '80s, when I was in elementary school, and it was time to get out of the house and connect with other kids and start to understand ourselves.

I'm glad I didn't open the thesaurus at the time.

The headline alone makes it seem like someone like me was born into a world with nothing to look forward to, but the truth is that I've been celebrated for the opportunities and adventures that life has brought me.

So I immediately looked up the 2009 online thesaurus, hoping for something worth mentioning.

this is the latest version

Unfortunately it didn't change much.

I felt particularly uncomfortable with two words that were considered "close to antonyms" and were defined as "complete" and "healthy."

This is not just a matter of words

Words like this create preconceptions

It's a matter of the values ​​of words and how those values ​​are created.

Language affects how we think, how we see the world, how we see others.

Many ancient societies, such as the Greeks and Romans, believed in the power of verbal curses because when you say them, they become real.

What kind of reality do we want to create Humans with limited possibilities? Or an empowered human?

Even if it doesn't seem like a big deal at first glance, it can block the child's true potential.

Would you like to give them a chance

Among the people who have provided me with convenience is the doctor at the hospital I went to when I was a child.

I'm Mr. Pizztillo. I used to go by the name of Mr. Pie because my Italian name was difficult to pronounce.

Pea always wore a colorful bow tie and had the perfect aptitude for dealing with children.

I loved spending time in this hospital, but I hated physical therapy.

There was one exercise that I was forced to do over and over again, and it was an exercise that strengthened the muscles in my legs, and I used thick rubber bands of different colors.

Even though he was only 5 years old, he even played a game with Mr. Pea to see if there was a way out.

One day, my teacher came to see me practice. It was a merciless, exhaustive exercise. The teacher said, ``Wow!

If it runs out, I'll give you $100."

Of course, this was Dr. Pea's way of encouraging exercise, but before he could possibly be the richest child on the ward, he effectively turned the bad exercise he was given every day into another experience he expected to expect.

I can't help but wonder how much his insight, his words about me being strong at such a young age, shaped my own way of thinking, the idea of ​​becoming an intrinsically strong activist in the future.

This shows how powerful adults can empower children.

But in the case of the thesaurus earlier, the words we use prevent us from moving toward the reality we so desperately want, eliminating the possibility of individuals seeing their own competence.

The language we use has not kept up with the changes in society, many of which have been made possible by technology.

From a medical point of view, laser surgery for my leg, blindness, artificial knees and hips, etc., allow me to reach closer to my natural strength, to move beyond my natural physical limits, not to mention social networking, the ability to self-identify and describe myself, and connect with people from all over the world who are the right fit for me.

Maybe technology is making it clear that we all have something rare and powerful to contribute to society, and that our ability to adapt is our greatest strength.

The ability of humans to adapt is an interesting thing. People have always wanted to talk to me about overcoming adversity.

By overcoming adversity, we mean the idea that success and happiness emerge beyond an experience that requires effort, unharmed and unchanging from that experience, as if success in life came from the ability to avoid the pitfalls that would exist in living with a prosthetic leg or in what is seen as my impotence.

But in reality, it's because we challenge ourselves that we change, both physically and emotionally.

i think it's a good thing

Adversity is not an obstacle you must avoid in your life

it's part of life

i think like a shadow

Sometimes I can see it clearly, sometimes I can barely see it... But I'm always by your side

I'm not trying to take away the pressure and burden that accompanies hardship.

Life is full of adversity, it's hard, it's relative, and it's not whether you meet adversity that matters, but how you meet adversity.

So instead of shielding our loved ones from adversity, we have to prepare them for a successful encounter.

When children feel that they're not adaptable, it's because of what we adults are doing that's backfiring.

The important difference is between the objective medical fact that I have no legs and the subjective social opinion that I am disabled.

The only obstacle I've ever faced is a world that defines me as I said before.

When we tell people we care about about an objective and painful prognosis, or when we tell them about living with an illness, we have to be careful not to create a wall that disables them.

Maybe our current practice of looking only at the cause of the problem and how to fix it may be causing more harm than just the disease.

If we don't see people as imperfect and realize their potential, we create more problems with our innate afflictions.

we're grading people's worth

You have to see through human potential without being bound by medical conditions.

Most importantly, there is a relationship between our apparent flaws and our greatest combined creativity.

So rather than avoiding these hardships or denying them as something you want to hide, find the opportunities that lie buried in adversity.

What I'm trying to say is not so much overcoming adversity, but rather the idea of ​​opening up your own potential against adversity and using that potential to wrestle and wrestle and sometimes dance together.

If adversity were found to be innate, harmonious, helpful, its existence would be less of a concern.

This year marks the 200th anniversary of Charles Darwin's birth. Evolution was written 150 years ago, and I think Darwin expressed the truth about human nature.

Humans are not the strongest species to survive nor the smartest species, they are the most adaptable species to change.

Conflict is the origin of creation

The work of scientists like Darwin tells us that our ability to survive and thrive is driven by the human mind's struggle to move from conflict to transformation.

Transformation and adaptation is a great human skill.

I guess we really don't know what we really are until we try.

Perhaps adversity teaches us self and self-sufficiency.

It's a gift you give to yourself

Adversity can be visualized as something more than just hard times.

You can see it as a change

Adversity is just a change we haven't adjusted to yet.

I think the biggest adversity we've created is the idea of ​​normalcy.

who is the normal person

there is nothing normal

There is no normality, there is no normality.

(audience: laughter) You don't feel it, do you?

If we can turn this paradigm of "close to normal" into something of "potentiality" or "potential" or something a little more dangerous, we can tap into the power of many children and discover their rare and valuable powers.

Anthropologists say that the only thing we humans have always asked of our fellow humans was to be useful and to contribute.

There is evidence that Neanderthals carried the elderly and the wounded 60,000 years ago, and perhaps their life experience of surviving hardships proved their useful role in society.

They were seen as one of the few worthy people, instead of being seen as injured and useless.

A few years ago, I spent my childhood looking at tomatoes at the grocery store in a Republican-leaning town in northeastern Pennsylvania.

Since it was summer, I was wearing shorts.

I heard a voice behind me say, "It's Amy Mullins."

I turn around and there's an old man standing there and I don't know who he is

I said, "Excuse me, have we met before? I don't recognize you."

"It's not unreasonable

When you were born, I gave birth to you."

(Audience: Laughter) Oh, that one.

came with a pin

He was Dr. Keen. My mother told me about the day I was born. I was born two weeks after my due date.

My obstetrician-gynecologist went on vacation, and I ended up going to the birth with a doctor I had never met before.

I was born without a fibula, my feet were bent inward, and my fingers were stuck in my feet.

The teacher said, ``I had to tell my parents that in the future you would never be able to walk, you wouldn't be able to move around like other children, you would have to live a full life, but you made me a liar.''

(Audience: Laughter) (Applause) What impressed me was that when I was a kid, when I saw it in the newspaper, my teacher would save the clippings, about winning the sophomore spelling competition, the Girl Scout march, the Halloween parade, winning college scholarships and winning sports competitions.

And he called this part of the lecture the potential of human will.

We can't predict how powerful the potential to influence our lives in coping with illness will be.

Dr. Keane added, "In my experience, children can get away with even a little bit of support, and without repeated negativity, they'll get away with what they have."

Keane made a change in thinking.

He understood that there was a difference between a medical situation and how to do it.

Over time, my perspective changed. If you had asked me, 15 years old, if I wanted to replace my prosthetic leg with a real one, I would have had no hesitation.

I wanted to be like everyone else back then.

But if you ask me now, I don't know

I'm thinking about what I've been through, not despite what I've been through.

Perhaps the reason the change happened so spontaneously was because more people opened the door to me than blocked my potential.

All it takes is one person, if you can teach me how to see the possibilities, I can pave my way.

Given the receptiveness of the human mind, giving someone the key to unlocking power and opening the door to someone at a critical moment is the best way to nurture.

It teaches you to open the door yourself

The word "educate" comes from the word educe

It means to bring out the potential to create something inside.

Now what kind of potential do we want to draw out?

Here's a case study from England in the '60s, when secondary schools were being organized into comprehensive secondary schools.

There was an attempt to organize classes according to ability in the United States

Divide students into groups A B C D

The curriculum of Group A is of a high standard, and the teachers in charge are top class.

For three months, at the beginning of the course, D-level students were told they were A-level clever students, and after three months, their grades reached A-levels.

Of course, there's a somber side to this study, where A-level students are told they're D-level.

students who remained in school, except for those who dropped out

Three months later it became a reality.

A crucial element of this case study was that the teacher was also deceived.

Even the teacher didn't know that there was such a switch

We were just being told that this was A and that was D, and that led to the way students were taught and how they were treated.

From this I can say that the only real handicap is, I think, the beaten heart, the beaten heart, the hopeless heart, the inability to see the good, the loss of the childlike curiosity that is supposed to be there, the loss of the innate imagination.

If we stay hopeful, if we see the beauty in ourselves and others, and if we inspire curious and imaginative minds, then we can truly be powerful.

When the mind has these properties, we can create new realities, new ways of being.

I'm going to end by reading a poem from the 14th-century Persian poet Hafis, which a friend of mine shared with me. It's called "The God Who Knows Only Four Languages."

dance with me thank you

(applause)

If you want to know how to handle a lobster

it's here it's true

Come back later and I'll show you how to handle it.

In fact, I've been studying mantis shrimp that make sounds for a few years now.

Here's a recording of a mantis shrimp that lives off the coast of California.

It sounds absolutely amazing, but this research turned out to be a difficult project.

And when I was struggling to figure out how and why mantis shrimp, or mantis shrimp, make the sound, I suddenly thought about their legs.

This mantis shrimp is called the mantis shrimp because it has nimble predatory limbs like a praying mantis. In addition to studying sound, I wanted to find out how it unleashes this nimble predatory attack.

So today, I'm going to talk about the devastating blows that mantis shrimp deliver, in collaboration with Wyatt Korf and Roy Caldwell.

Well, there are two types of mantis shrimp: spear and smash. Well, there are two types of mantis shrimp: spear and smash.

And this is a spear-shaped mantis shrimp

They live in the sand and feed on prey that pass above them.

Let's take a quick hit like this, and let's play it back in slow motion. This is the same kind of mantis shrimp. We're shooting at 1,000 frames per second and playing it back at 15 frames per second.

As you can see, it's an amazing leg stretch, and it looks like it's exploding upwards to catch the shrimp I've prepared for bait.

Another type of mantis shrimp is the comminuted stopod, but they break the shells of shellfish and eat them.

Place the shells like this and deliver a powerful punch.

(Laughter) I'll play it again.

You rock the clam to move it around, use your nose to pull it slightly, and hit it.

A few punches cracked the shell and he got a treat.

This pulverized catching leg can be stabbed with the tip or hit with the heel.

Today I'm going to talk about this slapping attack

The first question that crossed my mind is how fast this leg moves The first question that crosses my mind is how fast this leg moves

As you can see in the video, it's incredibly fast.

I immediately hit a wall

Berkeley's biology department's high-speed video cameras were too slow to capture this movement.

I simply couldn't take

This got me into trouble for a while

One day, someone from the BBC came to our biology department to talk about a new technology in biology.

I made a deal there

"If you can lend me a high-speed video camera that can capture this movement, I can shoot the research."

(Laughter) So, we have this amazing video system, which is the latest technology that came out just a year ago that allows us to capture extremely fast motion in low light.

Low light is important when photographing animals, because if it's too strong, it'll burn you. (Laughter) Now, this is the mantis shrimp.

Shake this heel to hit the clam

To make it easier to photograph, the clams are tied to a stick, and to make it easier to photograph, the clams are tied to a stick, and

(Laughter) I hope there aren't any shell charities here...

(Laughter) Now, this footage was shot at 5,000 frames per second and played back at 15 frames per second, so it's slowed down by a factor of 333.

As you can see, it's still pretty fast. We're slowing it down by a factor of 333. That's a pretty powerful move, isn't it?

My legs are stretched out and my body is leaning back. It's just a great move.

And we used this video to answer the first question by measuring how fast the legs move.

and met the first surprise

We calculated that the top speed of this leg's movement was from 10 meters per second to a whopping 23 meters per second.

If you'd prefer to speak in terms of speed, it's 72 kilometers per hour in water, which is very fast, isn't it?

So fast, in fact, that it added a new point to the animal's movement spectrum.

And the mantis shrimp officially had the fastest predatory attack of any animal, which was a surprise.

(Applause) This was a very interesting and unexpected discovery.

So how can this be done?

In fact, in the 1960s, the famous biologist Malcolm Burroughs was working In fact, in the 1960s, the famous biologist Malcolm Burroughs was working.

According to them, the mantis shrimp uses something called a "racket mechanism" or "click stop."

It basically consists of a large muscle that takes a long time to contract, and a latch that prevents any movement associated with it.

muscles contract but nothing happens

And when the muscles are fully contracted, the force builds up and the latch releases upwards, making a predatory attack.

This is what we call a "power amplification system."

It takes a long time for the muscles to contract, and the legs are fully extended in a short time.

I thought this explained

This is how the mantis shrimp unleashes a very fast attack.

But when I visited the National Museum of Natural History,

By the way, if you ever go there, behind this museum is the largest collection of mantis shrimp specimens in the world, and -- (Laughter) it's a real job for me.

(Laughter) So what I found was this beautiful saddle-like structure that's on the top of every mantis shrimp's leg, whether it's spear-shaped or pulverized.

It looks like a saddle for a horse

very beautiful structure

And this structure is surrounded by a membranous part, which I thought meant that this saddle-like structure was dynamic and flexible.

This discovery puzzled me for a while.

And then, after doing a series of calculations, we were able to show that mantis shrimp need something like a spring.

To generate the amount of force, the speed, that we've observed, the output of the entire system needs to be loaded into the spring.

So we thought, this is a spring, and a saddle can be a spring.

When I went back to the high-speed video, I could actually see this saddle shrinking and then stretching.

I'll show you one more time

And if you look at the video, it's a little hard to see, and the yellow part is the saddle, which is actually in the middle of the attack.

It's a little hard to see. The yellow part is the saddle. You can actually see this saddle stretching during the attack, and it stretches too much.

So we now have solid evidence that this saddle-like structure is indeed elastic, and indeed acts like a spring.

Saddle-like shapes are also known as hyperbolic paraboloids or saddle surfaces.

Architects and engineers know that this side is very resistant to shrinkage.

It's a curve that runs in two directions, with a line that bends up and a line that crosses it that bends down, so that in a structure like this, any perturbation is distributed over the surface.

So engineers know it well, and biologists don't.

In fact, it's known to some people who make jewelry as a structure that allows them to use less material and end up with something stronger.

When you make a thin gold structure, you want the shape to be strong.

I also know the architects very well, a very famous architect, Edward Catalano, who made this structure famous.

This is the saddle roof he built, 87.5 feet long (26.7 meters).

2.5" (6.4 cm) thick with only 2 supports

And he designed the roof this way because he was fascinated by the ability to create such a strong structure with so little material and so little support.

These basic principles apply to mantis shrimp saddle springs These basic principles apply to mantis shrimp saddle springs.

It's important to minimize wasted material when building biological systems.

This was a very interesting analogy between biology and engineering, and even more interestingly, the saddle of the mantis shrimp was the first biological hyperbolic parabolic spring to be elucidated.

It's a little long phrase, but it's interesting.

The next and final question is how much force the mantis shrimp exerts to break open the clam.

So I call it a load cell

I attached a measurement device that contained a crystal, which is a small piezoelectric element.

When this crystal is crushed, its electrical properties change in proportion to the applied force.

This animal is wonderfully aggressive and always hungry, so if you put a little bit of shrimp paste in front of the load cell, it will slap it.

And here's a video of this animal hitting the load cell with all its might.

Now we can get the force measurement

there was another surprise

We didn't think an animal of this size could handle 100 pounds, so we bought a 100-pound load cell.

immediately out of range

This is old data that I've taken looking for the smallest solids, and it still measured over 100 pounds of force, for an animal this size.

In fact, just last week, I got a 300-pound load cell, and it measured over 200 pounds of force.

I think this is also a world record.

I'll have to do a little more research, but I think this is the highest force per unit weight that an animal can produce.

Now, again, we can see the importance of the springs we mentioned earlier, which allow us to store force and release a lot of energy.

But the story doesn't end here

These studies, to put it briefly, are a tremendous amount of work.

These studies, in short, are a lot of work, and when you look at the forces on the system from all the measurements.

This is simply a graph with time on the horizontal axis and force on the vertical axis, with two peaks.

this really bothered me

The first peak is of course the legs

When you hit it, it comes out, and half a millisecond after that, there's this big peak, and I had no idea what it was.

There are several possible reasons for the second peak, but it's not possible after 0.5 milliseconds.

And when I went back to the high-speed camera footage, there was a good hint.

all in the same position as before

This is the secondary leg, this is the heel, and you shake it and it hits the load cell.

And what I want you to notice in this video is here, the surface of the load cell, where the leg flew off.

And did you see the flash for a moment?

Audience: Oh

Sheila Patek: If you pull out a frame and you can actually see the yellow arrow here, it's a bubble of steam.

this is cavitation

Cavitation is a very powerful hydrodynamic phenomenon that occurs when water flows at different velocities.

When this happens, there's an area of ​​lower pressure, and the water literally evaporates.

And when the vapor bubble collapses, it emits sound, light and heat, which is very destructive.

This phenomenon is caused by mantis shrimp, and it's also a phenomenon familiar to engineers, because it destroys boat propellers.

For years, people have struggled to design fast-spinning boat propellers that literally wear away and puncture metal and don't cavitate like this picture.

So this is a very powerful force in liquid, and I'm going to take it a step further and show you a mantis shrimp attacking a clam.

This was shot at 20,000 frames per second. This is all done by BBC photographer Tim Green. I couldn't have done it in 10,000 years.

You can see it hits the leg, and then it emits a lot of light, and then this cavitation spreads out over the surface of the shell.

Slow down this really, just amazing video, slow it down a lot.

You can see cavitation in a different way, where a bubble forms and collapses between two surfaces.

Some of you may have seen the force of cavitation extending down your legs.

Let's demystify these two force peaks. I think the first impact is the leg strike, the second is caused by the collapsing cavitation bubble.

Not only do these organisms use the force and energy stored in special springs to break the shells, but the powerful forces of hydrodynamics, they may actually be using hydrodynamics as a second force to break the shells.

If I had to say, it's an amazing double punch from this animal.

I have one question that I get asked a lot, and I'm going to try to answer it now. What will happen to the mantis shrimp?

Because if you're breaking shells, you're going to be breaking your legs, and that's actually happening.

Both of these are pictures of the heels of the legs, and you can see that they have been scraped away.

But the nice thing about being arthropods is that they molt, and every three months they molt, grow new legs, and they're all good.

A very convenient solution to this problem

I want to end with a punchy story.

(Laughter) So far, it's all about punches.

(Laughter) First, the saddle, the saddle-shaped spring, has long been known to biologists not as a spring, but as a visual signal.

Many species of mantis shrimp have a beautifully colored circle in the center of their saddle.

And it's very interesting that all species have an evolutionary source of visual signals in the saddle.

In my opinion, the reason for this has to do with the molting mentioned earlier.

When these animals enter the moulting stage, they become incapable of attack because their bodies become softer.

Attacking is literally suicide bombing.

This is true, and what they do is, until they can't attack anymore, they become horrible, obnoxious animals, attacking anything and everything they see.

And the moment it can't attack anymore, it's just going to give you a warning by swinging your legs around.

This is a classic example of one of the animal habits, bluffing.

This animal is known to bluff. It can't attack, but it pretends to.

So I'm very curious to see if the circle in the center of this colored saddle might contain some information about their offensive capabilities, their power to attack, and their molting cycle.

Here's a funny, bizarre fact that visual information can be found at the center of their springs.

The last time I worked with two collaborators, Wyatt Korf and Roy Caldwell, and me for three years.

Thank you to the Miller Institute for Basic Sciences for funding me to pursue science alone, and I'm done. Thank you very much.

(applause)

I'd like to talk to you today about the study of what technology means in our everyday lives, not in our immediate lives, but in a cosmic sense, the long history of the world, our place in the world.

what's this?

What is the importance?

I'd like to tell you what I discovered, the very first thing I studied was

It was the origin of the name "technology"

America has a State of the Union address that has been given by successive presidents since 1790.

Each is a summary of the most important issues facing America at the time.

If you search for the word "technology," you'll find that it's been used since 1952.

"Technology" didn't exist, so to speak, in people's minds until 1952, which coincidentally was the year I was born, although technology, of course, existed before then.

people didn't know that

It's like the awakening of this power that has been dormant in human life.

About the first use of the word "technology"

I looked it up, and it was 1829, and it was invented by the man who started a curriculum that taught the arts, crafts, and industries in a comprehensive way, and he called it "technology."

was used for the first time

What is it that everyone is being drained and bothered about?

Alan Kay said, "Technology is everything that was invented after you were born."

(Laughter) This is the view that everyone has about technology, all new.

I'm not talking about roads or penicillin or factories or tires, but new things.

A friend of mine, Danny Hillis, said something similar. He said, "Technology is something that is not yet available." (Laughter)

This also refers to the latest

But it's not just the latest

It's actually very old, and that's my suggestion.

Think about technology from a different angle, to imagine a world without technology.

If you remove all the technology in the modern world, from knives to scrapers to clothes, the human race won't survive very long.

Billions of people will die out very quickly. When wolves attack, people are defenseless. They won't be able to grow or find enough food.

Even hunter-gatherers used some simple tools.

It was minimal technology, but it had some technology.

When I studied other hunter-gatherer tribes and Neanderthals, our closest relatives to early humans, I found something interesting about a world without technology: their average age.

No Neanderthal fossils older than 40 have been found.The average age of hunter-gatherers is in their 20s and 30s.

Because of the high mortality rate, there are very few infants and the elderly, whose profile resembles that of the San Francisco neighborhood.

there are a lot of young people

If you go there, they'll say, "Everybody's healthy."

Because they're all young, hunter-gatherer tribes and early humans are the same.

I couldn't live past 30

It was a world without grandparents

Grandparents are very important, they are the carriers of cultural progress and information.

Imagine a world where everyone is in their 20s and 30s

How much can you learn?

You don't learn much in a lifetime. It's too short. There's no one to pass on what you've learned.

this is one aspect

It was a very short life, on the other hand

Anthropologists have found that many hunter-gatherer tribes with even the tiniest bit of technology don't actually spend a lot of time gathering the food they need -- three to six hours a day.

One anthropologist called this a primitive society, because it was a banker's working hours.

So we got enough food

But then food shortages began, then ups and downs, then droughts, and people were starving.

That's why it didn't survive long

With this very simple technology of stone tools -- even a small one like this -- early human populations actually wiped out 250 species of large animals when they first arrived in North America 10,000 years ago.

So long before the industrial age, humans were having a global impact with a tiny amount of technology.

Another thing that early humans invented was fire.

Fire was used to create glades, which again affected plant ecosystems and entire continents, and it was also used in cooking.

Make it possible to eat a wide variety of foods

In McLuhan's terms, it was kind of like an external stomach, so you could eat things you wouldn't otherwise be able to eat.

Without fire, man could not have survived.

The human body has adapted to this new diet

The human body has changed in the last 10,000 years

With little technology like this, humans grew from 10,000, the same number as Neanderthals, and language was invented.

About 50,000 years ago, humans exploded in numbers and quickly became the dominant race on Earth.

They continued to migrate across the globe at a rate of two kilometers per year, and over the course of tens of thousands of years, humans occupied every watershed on the planet, using very little technology to become the most dominant race.

We were already seeing climate change when agriculture was introduced 8,000 to 10,000 years ago.

So climate change isn't new, what's new is its degree.

Even in the agricultural age there was climate change

A small amount of technology has already changed the world.

What I'm trying to say is that technology has become the most powerful force in the world.

Everything you see here today that changes our lives can be traced back to the introduction of new technologies.

This is the force that has been unleashed upon the earth, it has become the most powerful force, and it has become who we are.

In fact, humanity and everything we think about ourselves was invented by us.

invented himself in domesticated animals

The most important animal we've tamed is ourselves, okay?

Human nature is the greatest invention, and of course it's not over yet.

I'm still inventing. Technology has made this possible by reinventing yourself over and over again.

It's incredibly powerful

This whole thing we humans call technology, all the things that are made, the little things in life, we call the tecnium, and that's the world.

Useful things made by people

That's my definition of technology

It's not just tools like hammers and computers

Of course the law and the city

convenient for people

Things invented by man are also deeply rooted in the universe.

Going back in time, the source and roots of technology

It goes back to the Big Bang, it's part of this self-organizing chain that starts with the Big Bang and runs through galaxies and stars to life and to us.

The three stages of the early universe were energy when the dominant force was energy. As it cooled, the dominant force became matter.

It's an information process that creates a new order, Einstein said, energy and matter.

I've discovered that they are equivalent, according to the new science of quantum computing, where entropy, information, matter and energy are all related and on a continuum.

If you put the energy in the right system, the heat that was spent, the entropy, the extropy will be expelled. This is order.

an increase in order

Where is the root? dating back to ancient times

no one knows

It's been clear from time immemorial that the universe as a whole has a tendency to self-organize, and we know it started with something like the Milky Way, which has maintained this order for billions of years.

Stars are basically fusion machines that have been self-organizing and self-sustaining for billions of years, and this order defies the entropy of the world.

Flowers and plants are extensions of the same thing, and technology is basically an extension of life.

One trend we see in these is an increase in the amount of energy passing through per gram per second.

Through this little chain, the amount of energy is increasing.

The amount of energy that passes through life every gram, every second, is actually more than stars, because stars have long life spans, and life has a higher energy density than stars.

The place where you can see the highest energy density in the universe is actually a PC chip.

There's more energy per gram per second going through it than anywhere else.

So what I'm trying to say is, if you want to see where technology is going, look at this trajectory.

So I took a similar thing, but I looked at evolving life from a different angle and asked, "What are the general trends in evolving life?"

These things tend to become more complex, more diverse, more specific, more perceptual, more ubiquitous, and most importantly, more evolveable.

This kind of thing also exists in technology.

technology is going there

Technology actually accelerates every aspect of life.

You can see it happening, and just as the diversity of life exists, so too will the things we make.

Life begins with ordinary cells and transforms into specialized ones. Humans have tissue cells, muscle cells, brain cells, same thing.

It happens to hammers, for example, and it starts out generic and then gradually becomes more specific.

There are six planes of life, but technology is fundamentally the seventh plane of life.

One of the branches that split from the human form

But technology, like life and other things, has a purpose of action of its own.

For example, three-quarters of the energy we use today is used for technology.

Transportation doesn't move people, it moves things made by people.

Let's say we want. Technology wants.

Robots want power, they want power cables.

Your cat wants more food, even if the bacteria are unconscious

i want to go to the light

It's driven by urges Technology is driven by urges

At the same time, I feel a need to give, and giving is basically progress.

All change aims at progress

Progress is undisputed, if you ignore the cost of doing so.

The question of cost troubles a lot of people, and yes, one of the things that bothers us when there is progress is the question, what is the environmental cost?

I looked up how many artifacts I had in my house, and it was 6,000. Some people say 10,000.

When King Henry of England died, he had 18,000 items in his house, which was the entire wealth of England.

With all of England's wealth, King Henry couldn't buy antibiotics, he couldn't buy a refrigerator, he couldn't buy a trip of a thousand miles, but this Indian rickshaw man could save his money and buy antibiotics, he could buy a refrigerator.

You can buy things that King Henry can't buy with all his wealth.

that's progress

Technology is selfish and generous

This conflict and tension will be with us forever. Sometimes we do what we want, sometimes we work for others. It's confusing how we think about new technology.

Now the default mindset when new technology comes out is the precautionary principle, which is very common in Europe, basically when you see a new technology.

I'm saying, "Don't do anything," until it's clear that there's no danger.

i don't think i can do anything with this

I think a better way would be the propulsion principle, which is to get involved with technology.

try it

We also do what the precautionary principle allows us to do: we try to predict, but then we test it not just once, but forever.

When expectations are not met, it's important to prioritize risk and re-evaluate old as well as new, address challenges and repurpose.

what does it mean

to find a new mission

Fission energy isn't good for bombs.

But I think it's a very good idea to take it elsewhere and use sustainable nuclear energy instead of coal to generate electricity.

When you have a bad idea, your response to this idea is not to have no idea, but to keep thinking.

Isn't the response to a bad idea a good idea, like the tungsten light bulb?

Good ideas against technology that people hate are basically good technology.

Technology is a way to generate good ideas, depending on how you think about it.

Sprinkling DDT on crops may be a very bad idea.

But the best way to eradicate malaria is to use mosquito nets impregnated with DDT at home.

It's a very good idea and a credit to the technology.

Our job as humans is to nurture our thinking children, find them good friends, and find them good jobs.

All technology is a creative force that finds the right job

here is my son

(Laughter) There is no bad technology, just like there are no bad kids.

I wouldn't say the child is neutral or positive.

I just need to find the right place

Over the long continuum of evolution, from the beginning of time, through the emergence of plants and animals, through the evolution of life, through the evolution of the brain, technology has made more and more of a difference to humans, increasing diversity, increasing choices, increasing candidates and opportunities, increasing possibilities and freedom.

all the way from technology

People are moving out of villages and into cities as a result of ever-increasing options and possibilities, and they're aware of the cost.

We pay a price, but we also realize that people pay a price for increased freedom, choice and opportunity.

Even technology demands clean water

Is technology antithetical to nature?

Technology is an extension of life, so it needs the same parallel things that life needs.

Technology should prefer biology, if that's allowed.

The movement of life that began billions of years ago has penetrated us and continues to do so. When it comes to technology, we should choose to align ourselves with this force that is much greater than ourselves. Technology is more than the objects and gadgets in our pockets.

It's more than man invented. This is a long story of life that began billions of years ago.

it's part of a great story

It's a story that runs through a self-organizing human being, and we're expanding and accelerating it, and we can be part of that story by aligning it with the technology that we're creating.

Thank you for your attention

(applause)

I've always been interested in the relationship between social institutions and structures and people's behavior.

If you build wide roads to the suburbs, people will move there.

Now, laws also have a powerful influence on how people behave.

What I want to talk to you about today is that by overhauling and simplifying our legal system, we can unleash the energy and passion of the American people to meet the challenges of our modern world.

I'm sure you've noticed that over the last 20 years or so, the law has become more and more sophisticated and infiltrated every corner of our lives.

Now, when you're in business, it's hard to do anything without consulting your legal counsel.

In fact, there's also this phenomenon: corporate lawyers are becoming CEOs.

It's like a parasite hijacking its host.

You need a lawyer to run a company because there are so many laws.

And it's not just business that's being affected by this, it's also casting a shadow over everyday civilian life.

A few years ago, I was hiking in Cody, Wyoming.

It wasn't until I got there that I realized it was a wild grizzly sanctuary.

Our guide is a local science teacher

I wasn't worried about the bear at all, but she was afraid of the lawyer.

Law talks continued

This is exactly what happened, when a student who submitted a late report had his grade reduced by 10%, and the parent threatened to sue the school.

The principal didn't want to confront the parent because he didn't want to be dragged into a legal battle.

She was called to many meetings, and always had the same arguments over and over again.

After 30 sleepless nights, she gave in and got her grades back.

"Life is too short to be involved in such things"

Also around that time, she was about to take two students to a leadership institute. The institute was in Laramie, a few hours away.

Please go by school bus."

As a result, a 60-passenger bus came along and took the three of them back and forth for several hours to Laramie.

Her husband is also a science teacher, and for biology class he would go hiking to a nearby national park.

But this year, they asked me not to do outdoor training because there was one person with a disability in my class, so the other 25 people couldn't go to outdoor training.

I could write a whole book on the legal stories I heard from this teacher that day.

We've been taught that law is the foundation of freedom.

Somehow, in the last 20 years, this free country has turned into a legal minefield.

Without realizing it, our lives have changed so much, and if you stop and think about it, it's everywhere.

The way we talk has changed, too, as a pediatric friend from North Carolina said, "We no longer treat patients the way we used to.

If you accidentally say something on the spur of the moment, it might be used against you later."

A doctor who works for people says,

My law firm has a list of questions you shouldn't ask during job interviews, including the infamous example of the nasty allusion to the question, "Where are you from?"

(Laughter) For the last 20 years, tort reformers have warned that litigation is spiraling out of control.

You've all heard the ridiculous lawsuits from time to time, where a dry cleaner in the District of Columbia was sued for $54 million for the loss of a pair of pants.

I believe this case has been going on for two years and is still on appeal.

But the truth is, these silly examples are pretty rare, and usually you don't win.

Total tort litigation costs are about 2 percent in the United States, which is double that in other countries.

But direct costs are really just the tip of the iceberg.

Without even realizing it, our culture is changing.

They were no longer free to act on their own best judgment.

what happened to this situation

I don't want to give up my right to correct it in court when someone does something wrong.

Some things are necessary, such as regulations to prevent pollution.

We don't even have the vocabulary to talk about this issue, because we're framing our arguments wrong.

We've been trained to think of all controversies and issues as issues of individual rights.

So look into the microscope that calls everything the law

I'll try to see, in Cody, Wyoming, is there any leniency for Johnny's late report?

Could the doctor have done something else when the patient's health deteriorated?

It goes without saying that the afterword is perfect.

You can always point out that there were different ways of doing things according to different scenarios.

We were trained to look through the microscope of the law with the idea that we could judge any controversy against the standards of a perfect society, where everyone would agree on what was fair, accidents would go away, and risks wouldn't repeat themselves.

Of course, this is a utopia, but society is dysfunctional and there is no freedom.

A perfect society is not the basis of a rule of law, it is not the basis of a free society.

This is the first of the four issues. I leave it to you as your homework, how to simplify the law. Laws must be evaluated broadly in terms of their impact on society, not in isolated controversies.

this is absolutely important

Now let's get out of the specifics and look at our society from above.

Is it working fine?

what does the macro data show

The health insurance system has been reformed Society is overwhelmed with defensive measures There is a ubiquitous erosion of trust in the legal system Defensive medical practices are ubiquitous

And the reason it's hard to assess is that it's a mix of intentions.

Doctors can sometimes provide better care by doing tests, but they no longer know what's right and what's wrong.

60 billion to 200 billion dollars are spent annually on testing, according to reliable estimates.

With that much money, we could provide health care to every uninsured American.

Lawyers say doctors provide better care because of the threat of lawsuits.

Research from the Institute of Medicine and others has shown that this is not the case.

Fear atrophies professionalism and causes thousands of tragic failures because doctors hesitate to say, "Is that dosage correct?"

Because I'm not sure, I don't want to take legal responsibility.

let's talk about school

I just showed you how a teacher in Cody, Wyoming, is being affected by the law.

Schools are literally drowning in a sea of ​​laws

Each of the following legal concepts could be devoted to a separate chapter: Children in need of due process and consideration Child dropout measures Severe punishment and labor management

It's still going on, and I did a regulatory review at a school in New York, and it was like giving up on the school's board of directors.

With thousands and tens of thousands of cautious regulations, it takes 60 steps to suspend a student.

What is the impact? discipline is relaxed

Another study attributes the decline in discipline to the prevalence of due process.

A nationwide survey conducted several years ago by Public Agenda found that 43 percent of American high school teachers said they spend at least half of their class time quieting down.

That means you're only learning half as much as you should, because if one person interrupts your class, no one can learn.

And what happens when the teacher tries to tell you to be quiet?

threatened to sue the law

A study found that 78 percent of middle school and high school teachers in the United States have been threatened with lawsuits for violating the rights of their students -- being accused of threatening students.

It doesn't usually go to court.

So how does the legal system work for governments?

Sacramento or Washington

Don't you think it's working?

In his State of the Union address last week, we all agree on the goal of what President Obama said: "First railroads, first highways. America has always been ahead of the curve.

There is no reason to give up the fastest trains to Europe or China."

There's a reason, in fact, that any major construction project spends most of its time on environmental standards assessment, which has become a cornerstone of the jubako, followed by years of litigation with those who oppose construction.

They're doing stupid things just to survive a little longer on Earth. (Laughter) All over the country.

(Applause) A few years ago, Broward County in Florida banned running to school.

(Laughter) So all boys get hyperactivity disorder.

It's a way that will never work

This warning label is also a masterpiece

Every coffee cup says 'Caution, hot'

When an archaeologist digs this up a thousand years from now, he doesn't realize it's a lawsuit, he just sees a warning label: "There's something hot in it."

You'll think it's an aphrodisiac or something

I can't explain it any other way.

Such a warning for a 5-inch lure is also a masterpiece.

Growing up in the South, I used to enjoy leisurely fishing.

A 5-inch lure is a big lure. It also has a trident hook attached to it. "It's dangerous if swallowed."

(Laughter) No one does this thinking it's sane.

But why? Because the law is not trusted.

Because the law is the worst of both worlds.At random, anyone can sue just about anything and bring it to court, and it's all too detailed.

There are so many rules in the regulated realm that I don't think anyone knows all of them.

So what do we do? The work of cutting down the legal jungle is never-ending.

And the real challenge here isn't a little bit of a legislative change, you need trust to be successful.

In order for the law to become a platform for freedom, it must gain the trust of the people.

This is my second suggestion. Trust is a necessary condition in a free society.

Life is already complicated enough without worrying about the law.

But law, unlike other variables, is based on state power.

the government intervenes

It changes the way people think

I have a little lawyer on my shoulder all day long whispering in my ear what if I fail

It takes away the cleverness of our minds and pushes us away from the well of the unconscious, the home of intuition, experience, and other creative minds and sound judgment, into a world of flimsy veneer consciousness and reasoning.

In time, the doctors will say, I don't think the headache is a tumor, but just to protect me, I'd like you to get an MRI first.

So $200 billion is wasted on unnecessary tests.

One study found that making people more aware of their decisions makes them less judgmental.

When a pianist is playing music, if you make him think about how he plays the notes, he won't be able to play.

Self-awareness is an obstacle to achievement

Edison once said, "There are no rules in my lab. I'm trying to create something new."

(Laughter) So how do we restore trust?

It's clear that changing the law won't be enough. Tort reform is a great idea. It will lower your costs if you're in business.

Even states that have thoroughly reformed their torts still suffer from these ailments.

So we need to not only limit litigation, but create new territories for freedom.

freedom has a proper structure

It's like this: the law defines the perimeter, it marks the boundaries of what you shouldn't do and what you must do. You shouldn't steal, you must pay your taxes.

As Isaiah Berlin puts it, "Laws define frontiers, not artificial lines, but boundaries that cannot be violated by those inside."

We forgot the second half

Boundary dykes have broken and people are drowning in the sea of ​​law.

What we need now is to rebuild these boundaries.

It's especially important to rebuild, especially for litigation.

The things one can sue form the boundaries of another's freedom.

As soon as someone starts a trial for a child falling off a seesaw, all the seesaws are taken down, regardless of what happens in the trial.

Because no one wants to risk a lawsuit.

So the seesaws, the jungle gyms, the merry-go-rounds, the climbing ropes, all of the things that are of interest to children over the age of four have been removed, because that way we eliminate all the risks.

So how do we rebuild

life is complicated

(Applause) It's complicated and software can't handle it.

All choices are based on social criteria -- involving value judgments, not objective facts.

So here's my fourth recommendation.

you have to change your mind

There are two essential elements here: we have to simplify the law.

We must move from the current complexity to general principles and goals.

The U.S. Constitution is short at 16 pages.

It's been working really well for about 200 years

The law should be simple enough that it makes sense to use in everyday choices.

No one will trust a law that doesn't make sense

how can i make it simple

And people's lives are complicated, and this is the most difficult and the biggest challenge. We have to restore authority, the authority of the courts and the Ministry of Justice, the authority of interpretation and operation.

(Applause) Law must be humanized again.

In order to create laws that are simple and allow people to feel free, and to interpret and enforce the laws at their own discretion in a manner consistent with rational social norms, those in charge must be free.

You have to go out and walk the sidewalks in the middle of the day and think, if you're acting rationally in the face of any controversy, there are people out there who think it's their job to protect you.

But today that person is gone

that is the biggest obstacle

It's not really a big obstacle, 98% of it is really easy.

You could be sued in small claims for a pair of missing $100 pants, but not a full-fledged lawsuit for a million dollars.

"Dismiss this action" or "Fight in small claims"

It'll be over in 5 minutes. That's it.

But what makes it a real barrier is the quagmire of the law. In the '60s, we fought against racism, sexism, pollution, and other terrible values.

Unfortunately, the system that came into being didn't allow us to have a good standard of values.

And I don't mean let those in power do what they want.

Those in power are also bound by general principles and goals. Teachers are accountable to principals. Judges are accountable to higher courts. Presidents are accountable to voters.

If you trace the source of accountability, you should determine the impact on everyone, not just explain to the disgruntled.

Society doesn't run just with common denominators

(Applause) Yes, we need a change of mindset.

If you change your mindset, you will be freed from many shackles.

We've been taught that authority is the enemy of freedom.

That's not true. In fact, authority is essential to freedom.

Law is a man-made system Responsibility is a man-made system

If the teacher doesn't have the authority to run the class and maintain order, everyone's learning will be hindered.

Unless we eliminate unreasonable allegations, everyone will be watching each other.

If the Environment Agency can't decide that a power line is good for the environment, it can't send electricity from a wind farm to a city.

A free society needs red and green lights or you'll be stuck in a traffic jam.

that's what's happening in the america around you

What the world needs now is a return to power that allows us to make normal choices.

It's the only way to regain freedom, the only way to unleash the energy and passion to meet the challenges of our time.

(applause)

Does anyone know when the stethoscope was invented?

does anyone know it's 1816

My prediction is that by 2016 doctors won't be carrying stethoscopes.

Better technology is emerging, and that's part of the change in medicine.

What has changed our society is wireless communication devices.

But from now on, it's a digital medical radio communication device.

Now let me give you some examples so that you can understand it more clearly.

First, here's an electrocardiogram

As a cardiologist, it's unbelievable to be able to see the heart rhythm in real time, on the physician's smartphone, regardless of where the individual patient is located in the world.

But this is just the beginning

You check your email while you're sitting here, right?

But in the future, we'll start looking at all the vital signs -- all the vital signs -- heart rhythm, blood pressure, oxygen, body temperature.

this has already happened

Airstrip Technologies Inc.

It's already connected, wirelessly, of course, and it's the aggregated signal, like the one from the hospital or the intensive care unit, that's displayed on the doctor's smartphone.

If you're expecting a baby soon, what about a device like this that continuously measures your fetal heart rate and your uterine contractions, so you don't have to worry too much about how well your pregnancy is going and when it's time to give birth?

So let's go further, although there are still continuous glucose sensors out there.

Right now, it's implanted under the skin, but in the future, it won't need to be implanted.

To keep your glucose in the ideal range, between 75 and 200, every five minutes with a continuous glucose sensor, you can see how that affects diabetes.

how is your sleep

Let's focus on this for a moment

You spend a third of your life sleeping

What if your phone, which is going to be available in the next few weeks, shows you how you're sleeping every minute?

As you can see, the arousal state is orange.

Rapid eye movement REM sleep, the dreaming state, is light green Light sleep is gray Deep sleep, the best restorative sleep, is dark green

How about counting all the calories

It actually measures calorie intake in real time, and of course burns as well, using something like a band-aid to measure it.

So far, we've been talking about physiological metrics.

But what I'd like to talk about is the next big thing. I'm going to be quick, but why are stethoscopes dying out? Because there are better ways to listen to valve sounds and breath sounds.

Why is this important, because it's much more sensitive.

Here's an example of an abdominal ultrasound machine, there's also a cardiac ultrasound machine, which communicates wirelessly, and there's even a smartphone that does fetal monitoring.

We're not just talking about physiological metrics, we're not just talking about key vital signs, but we're not just talking about physiological things, but we're talking about different types of moving images that you can see on your smartphone.

This is another example of obsolete technology, the Holter monitor, which will soon be obsolete.

It records 24 hours a day, so there are a lot of wires.

But now it fits in a very small patch like this.

You can leave it on for two weeks and you can send a signal by email.

So how does it work? Smart Band-Aids like this one, sensors you wear on your shoes and wrists.

This sends out a signal that forms a network around the body leading to gateways.

It can be a gateway with a smartphone, it can be a dedicated gateway, and now this kind of thing uses a dedicated gateway, because it's not very well integrated.

Signals are sent to the web, the cloud, where they can be processed and sent anywhere, they can be sent to caregivers, they can be sent to doctors, they can be sent back to patients.

Well, this is a high-level, very simplistic technical explanation of how it works.

I am wearing this device now.

I don't want to take off my shirt to show you, but I have it on.

This device can do more than just measure your heart rhythm.

This is my data, you can see the electrocardiogram.

Below is the actual heart rate and its evolution, and to the right of that is the bioelectrical properties.

It indicates fluid status, which is very important, especially when monitoring people with heart failure.

Below is body temperature, and then respiratory status and oxygen, and postural movement.

This device is really cool, because it measures seven parameters, and that's exactly the vital signs you can use to monitor people with heart failure.

Why this matters This is the most expensive bed

What if we could reduce the demand for hospital beds?

We can do that. First of all, heart failure is the leading cause of hospitalization and readmission in our country.

$37 billion a year is spent on heart failure, 80% of hospital-related costs.

If you're 65 or older and eligible for Medicare within 30 days of hospitalization, 27% will be readmitted within 30 days, and 56% will be readmitted by 6 months.

Can it be improved? I'm going to use this device that I'm wearing. I'm going to put it on 600 random heart failure patients.

Why now, why is this suddenly happening and an interesting direction for the future of medicine?

In a sense, the current situation is a perfect constructive storm.

This builds user-centered health management.

it all starts here

If you haven't noticed, let me explain why this is such a big trend. 1.2 million Americans have worn Nike shoes, which create a network around your body that connects your shoes and soles to your iPhone or iPod.

Wired Magazine has a lot to say about this, a lot about Nike shoes, how they've been rapidly adopted to monitor physiology during exercise and to monitor energy expenditure.

Here are some principles, and good guiding principles to remember: "The transformation of data-driven health care is about living by the numbers that will make us feel better, faster, and stronger."

And here's some really deep words, here's the cover story for the July issue: "The trend of using personal metrics goes well beyond diet and exercise to track every aspect of your life, from sleep to mood to pain, 24 hours a day, 7 days a week, 365 days a year."

i tried this device

Many of you have a Philips Direct Life.

i don't have one but i have a fitbit

is like this

It's like a wireless accelerometer or a pedometer.

I'm going to tell you what I've used, because I want to understand consumer behavior.

But Philips DirectLife works better, I hope so.

It measures food and activity and records body weight.

But most of the time you have to type it yourself.

All this device really records is exercise, and even that's not enough.

This device detects when you exercise

You enter your height and weight, and it calculates your BMI, and then it shows you how many calories you've burned through exercise.

This system requires you to enter all of your actions.

So I tried it, and it detected 42 minutes of motion, which of course made me happy. What I did was pedaling in an elliptical trajectory, but the system needs more information.

People ask me, "Let's document our sex life.

How long did it take you?"

(Laughter) They also ask, "How hard was it?"

(Laughter) We're even trying to get you to enter a "start time."

But this... it doesn't help much, yes it doesn't help much.

Now let's talk about sleep.

No one could have imagined that we would have a personal electroencephalograph in our homes.

This is the headband combined with the alarm clock I mentioned earlier.

EEG is continuously measured during sleep

I tried it for seven days to prepare for TEDMED.

Sleep is an important part of life, because we sleep one-third of the time.

By the way, how many of you have trouble sleeping?

It's usually around 90%, but you seem to be sleeping better than you think.

So here's my sleep pattern over the course of a week. It's the Z.Q. It's not the I.Q. The Z.Q.

Z.Q. scores are age-adjusted, so you'd better get as high a score as possible.

This shows sleep minute by minute over time.

The Z.Q value displayed there is over 80.

orange when awake

I realize this can cause problems

Not only does this system quantify your sleep, but it also lets other people know you're awake.

My wife could have come up and told me she was awake.

"Eric, I have a story to tell you."

But I'm a raccoon dog

this is very impressive

well this is the first night

Now it's 67. Not a very good value.

Of course, it gives you values ​​for all the states, like REM sleep time and deep sleep time.

It's very intriguing, because it quantifies all the stages of sleep.

And then they tell me how they compare to their peers.

It's like a controlled sleep contest.

it's really interesting

Look here and say, "I didn't think I was sleeping well, but I'm actually better than the average 50- to 60-year-old."

The important thing is that I dreamed a lot, even though I didn't realize it.

Now let's change from talking about sleep to talking about illness.

80% of Americans have a chronic condition 80% of people over the age of 65 have two or more chronic conditions 140 million Americans have at least one chronic condition 80% of $1.5 trillion in health care costs are linked to chronic conditions

Diabetes is one of the major diseases

Nearly 24 million people have diabetes

This is the latest map that appeared in the New York Times a little over a week ago, and it doesn't look good.

For men, 29 percent of people over the age of 60 in the country have type 2 diabetes.

But there's a way to measure this continuously, and that's with a sensor that detects blood sugar, and that's important because it can detect hyperglycemia that you didn't know you had.

We can't find the maximum and minimum values ​​in the same patient's finger bleed, shown by the red dot.

But by taking continuous measurements, we can record all this vital information.

And now, we're going to make this sensor into a band-aid, and we're going to do it in the not-too-distant future.

So let me just give you a quick rundown, but here are the 10 main things that wireless health care targets.

All of this is possible, and some of it is coming soon, and some of it, as you may have heard, is already happening in one way or another.

Alzheimer's disease affects 5 million people, and for this we can check vital signs, activity and balance.

We have a lot of asthma patients, but for this we can measure pollen count, air quality, respiration rate, etc. Breast cancer, I'll give you a quick example later.

I also have chronic obstructive pulmonary disease

When it comes to depression, there's great work being done on people with mood disorders.

We talked about diabetes, we talked about heart failure, and about high blood pressure, because 74 million people have continuous blood pressure monitoring, there will be better ways to manage and prevent it.

I talked about obesity and how to manage it.

And I have sleep problems.

We can do this all over the world, where smartphones and mobile phones are now ubiquitous.

This Economist article does an excellent job summarizing the health-related opportunities in the developing world: "Mobile phones are impacting many people's lives more rapidly than any conventional technology."

This is before the spread of health management using mobile phones.

The problem of an aging population is huge, with 300,000 hip fractures each year, but the solutions are fantastic, and there are so many different ways to do it.

I'd love to introduce you to iShoe, another example of using sensors, to improve proprioceptive sensations in older adults to prevent falls.

It's one of many technologies that use wireless sensors.

We can change the way we manage our ongoing health care. It can change all ages, from premature babies and fetuses to the elderly. It can change the field of pharmaceuticals.

There are two things that can accelerate this movement.

One is the launch of a specialized agency, which was fortunately initiated by the Scripps Research Institute and Qualcomm.

I was even more fortunate to meet Gary and Mary West, who sponsored the Wireless Medicine Institute.

San Diego is a special place

More than 650 companies related to wireless communication, more than 100 of which are engaged in health management through wireless communication

It's the center of commerce, and the interesting thing is that it's working very well with over 500 life sciences companies.

This Wireless Institute, the West Wireless Medical Institute, was founded by the collaboration of two wonderful people, Gary and Mary West, who are here tonight.

(Applause) This is what they've done with their incredible investment of humanity. It's a completely non-profit educational institution that's about to launch. It looks like this.

This institute is accelerating this era by addressing unmet medical needs, researching and refining them, with the appointment of Mehran Melagani as Chief Technology Officer, which was announced Monday, to further develop it, to validate it in clinical trials, to change practice, but the most difficult thing is to pay attention to out-of-pocket reimbursement, health policy and health economics.

We're going to have a great lab to drive this work, but the other thing that's important is that we're setting an example, assuming, of course, that healthcare is going digital.

It's great to be able to understand biological functions from genomics and omics, and perform physiological measurements all wirelessly.

Because it allows us to aggregate information like never before.

Over 80 diseases have been identified based on their genomes, which is amazing, because in the last two-and-a-half years, we've learned more about the foundations of disease than we've done in human history.

For example, right now, I'm working with an iPhone app that allows me to enter my genotype to guide drug treatments.

In the future, or even today, we can look at high-frequency genetic variants and see who gets type 2 diabetes.

You can also look at different genes to see who gets breast cancer.

We also know who is more likely to develop atrial fibrillation.

A final example is sudden cardiac death.

There are sensors for each

If you have diabetes, use a glucose sensor to prevent it

Give patients an ultrasound machine to help prevent or detect breast cancer early.

Use iRhythm for atrial fibrillation

Use a vital signs monitor to prevent sudden cardiac death.

700,000 people die each year in the United States from sudden cardiac death.

I hope you can see the immeasurable impact that this has on hospital resources, but it also has a tremendous impact on all the diseases that I talked about today.

It's taking personalized medicine to the next level, and it's super revolutionary, and I'd say it's the black swan of medicine.

Thank you for your attention. (Applause)

First, let me tell you what autism is.

Autism is one big continuum that includes everything from children with speech disabilities to brilliant scientists and engineers.

I'm comfortable here because it's full of autism genes.

You probably don't realize it... (Applause) It's a continuum of attributes.

Where's the line separating nerds from Asperger's?

Einstein, Mozart, Nikola Tesla, and everyone else today would be considered autistic.

I want to raise my children with autism to be new energy inventors, as Bill Gates just said this morning.

Now, to understand autism and animals,

talk about different ways of thinking

stay away from the language

I think in pictures I don't think in words

The autistic brain pays attention to details.

This is a test that asks you to distinguish between large and small letters, and the autistic brain recognizes small letters faster.

The normal brain ignores details.

If you're building a bridge, details matter, otherwise the bridge will fall apart.

The world today is too conceptually oriented.

I'm moving away from practicing

I'm very concerned about the decline in experiential classes, because I excelled in subjects like art.

It's about cows, and I've found that it's the little things that most people miss that make cows flinch.

For example, the waving flag in front of this hospital.

This hospital was about to be demolished, all they had to do was move the flag.

Busy movement was the cause of the problem

When I started this business, I went into the cow alley and tried to put myself in the cow's eye.

They thought it was funny, but the coat on the fence,

Shadows and floor hoses make cows flinch, nobody cared.

like hanging chains

It's often portrayed in my movies

I like this movie because it replicates my work very well, the grim side.

The pictures I drew also play a leading role

It's a movie called "Temple Grandin," not my book "Think in Pictures."

Thinking in pictures is in your brain

it's like watching a movie

my brain is like google image search

When I was a kid, I didn't know my way of thinking had changed

I thought everyone was thinking in pictures to write a book called "Thinking in Pictures"

asked people how to think

It was there that I was shocked to find out that my way of thinking was different from others.

If I say, "Think about a church steeple," most people think of something generic.

It may be different in this venue, but it's true in many other places.

in my case like google image search

Concrete images keep popping up one after another.

It's so well portrayed in the film that when I say the word "shoes," a lot of shoes from the '50s and '60s come to mind.

This is my childhood church, so specific, Fort Collins,

It's a famous church.

Like this, it emerges one after another

It shows up instantly, like an image search.

One by one, you can make it snow, or add lightning, or you can keep the image and make it into a video.

This visual thinking has been a tremendous advantage in designing livestock facilities.

I tried to make sure the cows didn't suffer a little bit in the slaughterhouse, but I'm not going to give you a graphic image here.

I've uploaded it to YouTube if you're interested.

I was able to test drive that equipment in my brain, like virtual reality in my computer.

Here's an aerial view of the reproduction of my project that was used in the movie.

very well done

(Laughter)

What worries me is where are these young people going?

They haven't made it to Silicon Valley, where they should go. (Laughter)

(Applause) I wasn't social, so I learned early on that I needed to sell my work, not myself.

I showed him my drawings and got a job at a livestock facility.

Another thing that helped me when I was a kid: in the 50s, you were taught manners.

We were taught not to drag items off the shelves and throw them away. Now, these kids were in third and fourth grade.

You might think that in the future we'll think more visually, like drawing in perspective, but

Not all autistic children have visual thinking.

This is a scan of my brain taken a few years ago.

Although this is a tensor image

This internet trunk of mine is twice as long as the comparison.

The red line is mine, and the blue line is the subjects of the same age and gender.

As you can see mine is very large and the blue line for comparison is very thin.

Some recent research suggests that people on this continuum actually use their primary visual cortex to think.

Visual thinking is also part of the way the brain works.

The autistic brain tends to become preoccupied with certain behaviors, being good at some things and bad at others.

I wasn't good at algebra, like geometry

class not allowed

Big mistake, even if you're bad at algebra

You can learn geometry and trigonometry

The other is pattern thinking.

more abstract, engineers and

Good for programmers

Here's an example, this praying mantis

Made from a single piece of paper, no tape, no scissors

In the background is how to fold

The type of thinking, from a realistic, visual thinker like me to a pattern thinker, a musical or math brain.

I'm not good at reading

Children with aphasia also have this type.

There are these different types of brains

I have a verbal brain, I'm an informed type.

Then there's the issue of perception.

I was reluctant to wear this headset

So I came here half an hour ago to try and get used to this, and I had it adjusted so it wasn't hitting my chin.

Perception becomes a problem, fluorescent lights,

Some children are sensitive to noise

There is a lot of variety around here

My visual thinking has helped me a lot in understanding how animals feel.

Animals are perceptual creatures, not language, they think in pictures, they think in sounds, they think in smells.

Think about how much information is in a simple fire hydrant

If it's a dog, who was there when?

That fire hydrant has a huge amount of information.

very specific information

Examining these details gave me insight into animals.

Animals and my brain sort the information they perceive into categories.

A person riding a horse, a person standing on the ground, these are perceived as completely different things.

Suppose you have a horse that has been abused by its rider

This horse isn't afraid of vets and farriers, but he won't let you ride it.

Suppose you have a horse that has been abused by a farrier, and it becomes afraid of things on the ground and of the veterinarian, but it can still ride, and so can the cows.

man on horseback and man standing

these are different

It's a different "picture"

Think about how specific

There are many people who are not good at this sorting of information.

When I'm solving problems with facilities and things like that, they don't get it. Is it a matter of training people?

is there a problem with the equipment

We have to separate equipment problems from human problems.

a lot of people don't like this

Let's say this was an equipment issue

Is it something that can be repaired by yourself?

Is it bad design in the first place?

Many people can't figure this out.

Let's consider another problem: suppose we want to make planes safer.

i am a million mile flyer

I fly a lot. If I were at the Federal Aviation Administration, where would I look?

It's the tail of an airplane

In the last 20 years, there have been five major accidents, either due to a detached tail or a failure of the steering wheel in the tail.

The problem is the tail, no doubt.

Even if the pilot looks around the plane

I can't see inside the tail

When I think about these things, I pick up all the details.

Validate from specific and basic parts

Collect small pieces and put them together like a puzzle

This horse is extremely afraid of black hats.

You were abused by someone wearing a black hat

A white hat is fine

Now, the important thing is that the future will require all types of brains to work together.

We have to work on developing these brains.

One of the things that irritates me is that I go to autism conferences all over the place, and I meet a lot of potential geniuses, they're just a little bit unsociable, but no one is really trying to get them interested in science or anything.

Now let's talk about my science teacher.

The teacher is beautifully portrayed in the movie.

In high school, I was treated as a bad student, until I took Mr. Carlock's science class.

I never bothered to study

In the movie, he appears as Dr. Carlock.

He tricked me into solving an optical illusion.

It's about presenting things that pique the interest of the children.

One of TED's jobs is to teach schools about its wonderful talks.

Teachers in the Midwest and other less advanced areas don't know what to do.

That's why I lose my way

You can have a more thoughtful, cognitive brain, or you can have a more social brain.

Research has shown that there are extra circuits in the back of the brain in autism. Instead of producing geniuses, they lose their social circuits, a trade-off between thinking and social.

When this is extremely biased, they stop using the language at all.

Unlike animals, in the human brain, language masks visual thinking.

This is the work of Dr. Bruce Miller.

he studied Alzheimer's patients with frontotemporal dementia

This picture suffered a speech impediment

Drawn by a former car assembler

Van Gogh probably didn't know physics, but what's interesting is that the swirls in this painting follow a statistical model of turbulence.

I always write down the information I get in Wolfram, the words I use to search for it, because I need it for my autism lecture.

I'll show you something interesting.

Technology, drawing design, and art classes have been removed from the curriculum.

art was my favorite subject

We must not forget these brains. We need to work with different brains. There will definitely come a time in the future when we need these types of people.

let's talk about work

I was a bad student who hated studying until my science teacher pushed me

I had work experience

There are a lot of kids who don't know the basics like being punctual, which I was taught at the age of eight.

Learning table manners at my grandmother's house

I was taught at an early age

When I was 13, I worked as a seamstress in a tailor's shop.

In college, I participated in an internship and made a lot of things, and I learned how to do assignments.

My mother told me that I only draw pictures of horses

"Why don't you draw another picture?"

I need to know how to do things differently

I encourage you to build other things.

Autistic brains tend to be obsessive

If you like racing cars, use them for math.

How long does it take to run this distance? And

You use obsession to motivate your child.

It's really frustrating, mainly because the teachers in the far provinces don't know how to treat them.

it's maddening

What is the right job for a visual thinker?

Graphic design, computers in general, photography, industrial design, etc.

If you're a pattern thinker, you're a mathematician, a software engineer, a programmer.

Verbal thinkers are good journalists, and they're also good stage actors.

Because people with autism learn to socialize like they're acting theatrical.

I have no choice but to learn

we need to learn together

It's the story of the leader

my science teacher was unofficial

I was a NASA scientist.

In some states in the United States, if you have a degree in biology or chemistry, you can come to school and teach.

should do this more

I feel that there are a lot of teachers at community colleges who are suitable for these kids.

We should invite them to high school, another possibility is

It's about being taught by people who have retired from the software industry, and it doesn't matter if what you teach is old.

It's important to be the trigger

I turn on the kids

you will learn new things

leaders are essential

For me, Professor Carlock's influence is immeasurable.

i need to hire them

So let's say an intern at your company has a child with autism.

I'll give you more detailed instructions.

"The software for the phone must have this function. This is the only memory available."

These are detailed instructions

this is the end of my story

thank you for listening

I am honored to stand here.

(applause) Got a question? OK

(Applause) Chris: Thank you very much.

One of my favorite quotes from you is, "If some kind of magic wiped out autism, humans would still be living around campfires at cave entrances."

Temple: I think the first person to make a stone spear was someone with Asperger's, if he didn't have autism.

Silicon Valley will be over, and the energy problem will not be solved. (Applause)

Chris: I'd like to ask you a few questions.

If you're here with someone who has a child with autism, or knows someone with autism, and you feel like they're not opening up, what advice would you give them?

Temple: First, age matters.

If your child is 2-4 years old and doesn't talk and is not social, start teaching them one-on-one tutoring at least 20 hours a week now.

Autism has a range

About half of that continuum won't learn how to speak, they won't even work in Silicon Valley, they're just not cut out for it.

but the other has mild autism

They're potential geniuses. Show them something interesting and flip the switch.

I learned social skills from our shared hobbies, riding horses with other kids, building model rockets and doing electrical experiments.

In the '60s, we put rubber membranes on speakers, glued mirrors, and flashed lights, and I thought it was really cool.

Chris: Is it difficult for autistic parents to get their children to love them the way they want them to?

Temple: No, kids are very loyal. If there's a fire, they'll come to the rescue. Chris: That's amazing.

When you ask people what they're into, they say "kids" or "lovers."

what are you obsessed with?

Temple: The fact that your actions are making the world a better place for mothers of children with autism.

It makes me happy when people say, "You're the reason my child went to college."

The slaughterhouses were also terrible, so we created a simple rating system.

It's just a matter of measuring the results.

It's very simple how many were in agony

just a few observations

this was very effective

It was satisfying to see it transforming the real world, not just conceptually.

i need more like this

(applause)

Chris: When I spoke to you on the phone, you said you were interested in server farms.

Temple: Excited to learn about server farms

It's a bundle of knowledge

it's a library

knowledge for me

It's very valuable. Over ten years ago, my neighborhood library was flooded.

It was before the Internet

I was upset when my books fell apart, because it was the collapse of knowledge, and server farms and data centers.

It's a huge library of knowledge.

Chris: It's an honor to have you here at TED. Temple: Nice to meet you. Thank you.

(Applause)

If you're a blind kid in India, you have at least two big pieces of bad news to face.

The first bad news is that there is little or no access to treatment, because most vision programs in India target adults, and very few hospitals have treatment facilities for children.

In fact, even if you can get treatment, it's likely that you'll be treated by someone who probably doesn't have a medical degree, like in the case of Rajasthan.

This girl is a three-year-old orphan with cataracts.

The caretaker took the child to the village shaman, who refused to advise the caretaker to take her to the hospital, and decided to burn her abdomen with a hot iron to exorcise the demon inside her.

The second piece of bad news for you is from a neuroscientist, and it's that if you're four or five years old or older, your brain has really little chance of learning how to see things, even if you get eye treatment.

These two pieces of news made me very sad, both scientifically and personally.

First, I'd like to share with you a personal reason.

It's not a pretty story, but I'll be honest with you.

This is my son Darius

As a new father, I have a bit of an alien feeling about how sensitive babies are, what your obligations are to them, how much you love them.

I will do everything in my power to help Darius. When I hear that there are other children like Darius who can't get treatment, I instinctively think it's wrong.

this is for personal reasons

Now for the scientific reason: the neuroscience view of the critical period is that after the age of four or five, the brain loses its ability to learn.

This idea comes from the work of David Huebel and Torsten Wiesel, who were both at Harvard University, and who won the Nobel Prize in 1981 for their work in visual physiology.

The results of this study, done as far back as the '60s, using kittens raised on a variety of deficient diets, are now being applied to modern human children.

So I think I have to do two things.

The first is to reach out to children who currently have no access to treatment.

this is a humanitarian mission

And our scientific mission is to test the limits of visual plasticity.

As you can imagine, these two missions are perfectly compatible with each other. In fact, the two missions are impossible without one.

I launched Project Prakash a few years ago to carry out these two missions.

Prakash, as many of us know it, means light in Sanskrit, and this project has the potential to bring light into the lives of many children, while also unlocking some of neuroscience's deepest mysteries.

The logo looks very Irish, but it's actually derived from the symbol for a ceramic lamp called a diya in India.

Prakash's purpose is three-fold: to reach out and find children in need of care, medical treatment, and then research.

So I'm going to show you a short video, and this video is going to explain the first two purposes.

This is a support center, it was held at a school for the blind.

[Most of the children are permanently blind or almost blind] (Sinha) Because this is a school for the blind, many children are permanently blind.

Cases of microphthalmia are malformations of the eye that are permanent and cannot be treated.

This is an extreme case of microphthalmia, called invagination.

But sometimes we come across children with very little vision, and this is a very good sign that it may be treatable.

So after testing, we bring these kids to the hospital.

The hospital in Delhi where we work is called Shilov Charity Eye Hospital.

This is a very well-equipped hospital, and this pediatric eye center was founded with the help of Ronald McDonald's foundation.

Eating a hamburger helps too.

[Examinations like this can improve the eye health of many children.

We can find a child who can participate in Project Pararakesh.] (Sinha) If you look closely at this child's eyeballs, you can see the cause of his blindness.

Can you see the white spot in the middle of the pupil?

The lenses in our eyes are transparent, but this child's lenses are opaque, which is why he can't see.

So I treated this kid, and I think you can see a picture of his eyes.

Here's a picture of an eye with an opaque lens, and I removed the opaque lens and inserted an acrylic lens.

And this is the same child's eye after surgery, three weeks after surgery, right eye open.

(Applause) Thank you.

And I hope that by just watching this video clip, you can see that it is possible, and we have treated 200 children so far, and we will continue to do so.

After treatment, this child's vision improved significantly.

This story also applies to people who have had little vision for several years and then regain their sight.

A few years ago, I wrote a paper about a woman. On the right side of this picture is a woman with SRD.

I have to add the sad news that she died in a bus accident two years ago.

But her case was really inspiring, it's not very well known, but it's very encouraging.

As you can imagine, when these results came out, there was a lot of talk in scientific journals and in the general press.

Here's an article that was published in Nature, this project was published, and there's also Time magazine.

And so we're convinced that restoring sight is feasible, even if you've had very little vision for a long time.

The next question, of course, is, what was the recovery process like?

In our study, we found children who were sensitive to light.

I'm going to treat the child.I want to emphasize that this treatment is completely free.There is absolutely no compensation.

We treat many more children than those directly involved.

Treat all children who need treatment

Almost every week after treatment, the child is given a battery of vision tests to see how their visual abilities have developed.

We will continue this test as long as we can.

This sequence of development provides us with unprecedented and very valuable information about how the skeleton of vision is formed.

What is the causal relationship between the ability to develop early vision and the ability to develop later vision?

I've used this general method to study the development of vision from many different angles, but I would like to draw your attention to one thing in particular: the ability to perceive images as objects.

Any image you see on the left, whether it's a real image or a composite image, is made up of small areas like you see in the middle, areas of different colors and different luminosity.

The brain does complex processing to combine and integrate subsets of these areas to form more meaningful and recognizable objects, like the one on the right.

But no one really knows how it all comes together, and that's the problem we're looking at at Project Parakash.

This is what happens right after you regain your sight.

This man regained his sight a few weeks ago, and MIT graduate student Ethan Myers did an experiment with him.

His vision and movement weren't co-ordinated, and he could roughly tell which areas his eyes were trying to follow.

If you show him images of the real world, or show them images of the real world to anyone else like him, they can't perceive most objects because the world is too fragmented, and it appears to be composed of combinations and jumbles of regions of varying color and luminosity.

This green line shows that

Even if they don't know what an object is, if you ask them to point out where the object is, they will point to areas like this.

We see the world as a complex combination of these realms.

Even the shadow of the ball can be seen as a single object.

Interestingly, after a few months, this is what happens.

(Doctor) How many are there?

(Patient) Two.

(Doctor) What does this look like?

(Patient) This is..

This is a circle and this is a square

(Sinha) A dramatic change has taken place

So the question arises: How did this change come about?

This is a very important question, and what's even more amazing is that the answer is so simple.

The answer is in motion, and that's what I want to show you in the next clip.

(Doctor) What shape do you see?

(Patient) I'm not sure

(Doctor) How about this?

(Patient) Triangular

(Doctor) How many things are there here?

how many would there be

(Patient) Two

(Doctor) What is this?

(Patient) I see squares and circles.

(Sinha) I see many cases like this.

Motion information is what the visual system needs to analyze the world.

The inference that can be drawn from this, and I've done a lot of experiments, is that the analysis of movement information, or the analysis of movement, is an important foundation for other complex visual analyses.

This simple idea has wide-ranging potential applications.

So I'm going to talk briefly about two things, one in the technical realm and the other in the clinical realm.

From a technical point of view, the question arises: Now that we know that motion is so important to the human visual system, can we take advantage of it to develop a machine-based visual system? So a machine that learns on its own and doesn't need to be programmed by a human.

And that's what we're working on now

I'm at MIT, where you're expected to put all the basic knowledge you've acquired into practical use.

We're developing a computer system called Dylan, and we have a lofty goal: to take visual input that would be receptive to a human child, and automatically find objects in that visual input.

Don't worry about what's inside Dylan

I'll just tell you how to test Dylan.

When we test Dylan, we give it the same kind of input that we give babies and children in Project Prakash.

But for the longest time, we didn't know how to get this video input.

So I thought, what kind of input is the information that you give Dylan by giving Darius a little camera?

and we put it into action

(Laughter) It took me a long conversation to convince my wife.

(Laughter) Actually, Pam, if you're watching this, please forgive me.

We modified the optics of the camera to reproduce the vision of a baby.

As some of you know, babies are born almost blind.

We have 20/20 vision, but babies have about 20/800 vision, so they see the world in a very, very blurry way.

If you look at it with a small camera, it will look like this.

(Laughter) (Applause) Fortunately, there's no sound when you shoot.

What's amazing is that even with such low-quality input, babies can discover meaning from the input very quickly.

After another 2-3 days, the baby will start paying attention to the father and mother.

how are you doing I want Dylan to do the same thing, using the idea of ​​using motion, even with this amount of visual information.

Dylan is going to be able to do the same thing, and after six or seven minutes of video, Dylan will start extracting patterns of information, like faces.

This demonstrates how using motion can be effective.

clinical insights come from the autism field

Some researchers have linked the integration of visual information with autism.

When we learned this, we wondered if the poor integration of visual information might explain the poor processing of movement information in autism.

Because if this hypothesis is correct, it would change our view about what causes autism to have different phenotypes.

The video you're going to see is a neurologically normal child and an autistic child playing with a pong.

Tracking the gaze of a child playing with a pong

The red part is the line of sight

This is a neurologically normal child, and if you look closely, this child is taking cues from movement information and predicting where the ball is going.

Before the ball goes, this kid has already seen the place.

Let's compare this kid and the kid with autism playing the same game.

Instead of predicting, this kid is always looking where the ball was.

In autism, there appears to be a major impairment in the ability to process movement information.

I'm working on this research right now, but I hope to get more information in the future.

Looking ahead, if this circle represents the number of all the children we've ever treated, then the size of the problem is about this.

These red dots represent children who are not receiving treatment.

So many, many children need treatment, so to expand the scope of this project, we have a plan called the Prakash Center for Children, which is both a school for children treated in a pediatric hospital and a state-of-the-art research facility.

The Prakash Center integrates medicine, education and research to truly create an overall result that is greater than the sum of its individual departments.

So to summarize, Prakash, five years old, has made a difference in many areas, from basic neuroscience, to brain plasticity and learning, to hypotheses that have clinical application, like autism, to developing autonomous visual systems, to educating college and graduate students, and most importantly, to reducing the number of blind children.

Both me and my students have had such a great experience, because we've been able to do some really interesting research and at the same time help the kids that we're working with.

thank you

(applause)

I think it was when I was in second grade that I painted a nude bust of Michelangelo.

I was immediately summoned by the headmaster, who was a kind-hearted nun. Frowning her brows, she opened her sketchbook and looked at all the nudes.

I had no idea what you were talking about, but I thought I'd never draw it again.

The class was so boring that I started drawing caricatures of the teachers at school.

Popular in class

I have poor motor nerves and do not play sports

the house is not rich

Not even the top of the class

Even someone like me can appeal my existence through manga

I became popular, but I didn't want my teacher to scold me.

I quickly put all the drawings together into a collage, and as a tribute, I put the principal on top and took it to the principal's office.

The principal laughed so hard at the other teachers and put the picture up on the bulletin board.

(Laughter) This is part of it.

I became a school hero

Everyone knew me and I felt special

let's talk about family

this is my mother i love my mother

Taught me how to draw, and even taught me how to love

looks like a hippie

I was told "Don't say that"

My brothers are all boring geniuses, and they collect stickers from prestigious schools and put them on our Indian car.

my dad is a little different

He believed in a holistic approach to life, and he always told us, "I don't like this book, it's contaminated with the industrial revolution."

When my father was still holding onto that worldview, I was 16 years old, backed by Mr. Karthik, the best lawyer in town, and I put him in my seat and said, "Daddy, from now on, I'm going to be disciplined, be curious, and learn new things every day.

My father was so moved that he tried to embrace me with tears in his eyes.

"wait a minute -

So can I quit school? " said

In short, I quit school to become a cartoonist.

I drew about 30,000 caricatures [First appearance, cartoonist]

Birthday parties, weddings, divorces, whatever the job, I got it from anyone.

But let's not forget, as we traveled, we taught children how to draw cartoons, and instead we got frankly angry.

I learned to be crazy and to have fun.

When I started teaching them, I wanted to make this my job.

I opened a school when I was 18

But at 18, it's hard to run a school without strong patrons and sponsors.

One day, I was flipping through India's Time magazine, and I learned that the Prime Minister was in Bangalore, where I was.

I mean, for example, every cartoonist here wants to meet President Bush, you know, because I love drawing that face.

I really want to meet the Prime Minister

By the time the helicopter was about to land, I went to the location and a security guard

were placed in multiple

Until the third guard, I drew caricatures while making the guards laugh, but I was finally stopped.

But luckily, I found a nuclear expert who had painted a picture at a party some time ago.

When I called out, "It's been a long time."

"What are you doing here?"

I replied, "I'm here to see the Prime Minister."

he said "me too"

So I climbed into his car and made my way through the rest of the security line without difficulty.

(Applause) Thank you.

I sat him down and drew him, and I've drawn hundreds of celebrities since then.

This work is a nostalgic piece

Salman Rushdie might be mad because I changed the shape of New York

(Laughter) Anyway, the next slide (Laughter) should be deleted.

The next work is a little more serious

I was wondering if I could show you this, but this was put out right after 9/11.

For me, it was just pure expression, but it spelled disaster.

When I got home that night, I had hundreds of protest emails and hundreds of people telling me they didn't want to see this.

I was asked to withdraw from the cartoon association in the United States, which was my mainstay.

It made me realize the immense power of comics, and that with art comes responsibility.

I thought I needed a break anyway, so I decided to take a break.

I quit my newspaper job, closed school, took pens and brushes and ink and decided to travel.

My best memory from this trip is one wonderful old man I met while painting in Italy, and I knew he was an artist.

I was invited to his studio, and I went there.

I saw something weird that I had never seen before

A nude sculpture of himself hung from the ceiling like a corpse.

"What the hell is that?"

When I asked him, he said, "Oh huh? I'm dead at night

In the morning you will be reborn again."

I thought you were crazy, but it stuck in my mind.

what a wonderful thing i like it

"I am dead I must be born again"

I wanted to be a painter like him 【Second appearance, painter】 But I don't know how to draw 【Second appearance, painter】

I also went to an art supply store.

There are hundreds of types of paintbrushes

Even if I knew how to draw, I couldn't choose, so I decided to give up.

I decided to study by myself

Here's a little clip of how I drew it, in my hometown of Bangalore.

(music) These are bigger than life

Everything is big, the next picture is even bigger

got even bigger

dance while drawing

It was very interesting

But when you start drawing dancers -

This is a flamenco dancer, but I've run into a problem.

I didn't know how to dance, so I followed them, sold paintings, raised money, flew to France and Spain to work with them.

Pepe Linares, a famous flamenco singer.

The problem is that my painting never danced

No matter how much I put my energy into painting, I never danced.

It was 2 o'clock in the morning when I had a little silly idea.

I called a friend to paint my body and have him dance in front of the painting.

And suddenly the painting came to life.

I was lucky enough to have that performance in California with Velocity Circus.

Sitting like you, watching from the audience

Breathing life into my work

Normally, I draw by myself and show them in galleries, but here my work came to life, I collaborated with other artists.

it turned out to be a great work

He said he would collaborate with anyone he met

I started with fashion

I also did a fashion show in London.

The best collaborations, of course, are with children.

They're cruel, they're honest, they're energetic, they're awesome.

I've designed a library that the Robin Hood Foundation is helping restore.

I also worked with children in the Bronx.

Children taught me how to act cool.

I don't think it looks cool

They say - it's not "excuse me" it's "bad"

(Laughter) All was well, but I still wanted to paint like a real painter.

But tuition in America is expensive.

I was walking down the street in India and I saw a sign painter.

They were doing some really big paintings, and they were really good at it.

How do you draw from such close range? it was strange

One day, I met one of them, and I said, "How do you draw? Who taught you?"

He said, "It's very easy. I want to tell you. I'm leaving this town soon. The job of painting billboards is running out. Artists are on the verge of extinction. Digital printing is the mainstream now."

I started a company, promising to support them in exchange for teaching me how to draw.

Since then, I have drawn in various places.

This is a picture of my wife that I painted on the wall of my apartment.

this is another

I could draw practically anything and send it all over town.

Since we're talking about my wife, I'd like to talk about the most important collaboration with my wife, Netra.

met when she was 18

When I was 19, it was love at first sight.

I was in a long distance relationship in India and America

She came to see me every two months, and she said, "I'm a man, and I'm a man, so I'll go back and forth."

"I'll cross the seven seas and go see you"

I went back and forth twice and became penniless

"Nets, what should we do?"

She said, "Can you send me a picture of you?

Because many of my father's friends are rich

I wonder if I'll buy it if I try to persuade him somehow..."

When I actually sent her a picture, I found out that her dad's friend was really weird, just like you.

it's a joke

(Laughter) No, they were really great weirdos. They didn't know much about art.

Netora has 30 paintings I drew

I put it in a small van in a rental car and drove around the East Coast trying to sell the painting.

I contacted anyone who was interested in my paintings.

And he sold all his paintings and made enough money to pay for my move and four years of living, brought in a lawyer, started a company, did everything, and became my manager.

This is a photo from NY

Interestingly enough, we were equal at this point.

something seems to have happened somewhere

(Laughter) And that's how Netra managed my work, and I had a lot of success.

I felt like a rock star and I was so happy

It felt so good to be noticed

It was featured in many articles, and we decided to celebrate.

i think the best thing is to get married

Said "Let's get married"

"It's not just a wedding, let's invite all the people who have supported us so far, and the people who bought our paintings."

It's a lie, but I made a list of 7,000 people.

150 artists volunteered to help

Fashion designers, spatial designers, models, make-up artists, jewelry designers, so many people came out to make our wedding an art exhibition.

I had you come specially to make presents for my wife's family.

Some vegetable sculptors

These series of events were published in magazines and newspapers.

Three years later, it's still in the news, but not long after that, something unfortunate happened.

my mother had a serious illness

My dear mother has fallen ill It won't be long now so say goodbye

I was suddenly told to do what I wanted to do

i got really depressed

I have shows scheduled up to a year in advance

was going well

It's no longer the case

i lost my passion

I can no longer enjoy anything [thinking about another form]

After that, I began to explore the darkness of the human heart [thinking about another form]

The work became ugly, and not only

all the customers ran away

All the Bollywood stars who partied with me and bought my work have gone.

Collectors, friends, and reporters all said, "I like it, but...thank you."

It means "it's fine"

But I wanted people to feel my work from the inside out, because I drew it from the inside out.

If they want something beautiful, go ahead, this is my beauty, my political message.

Of course no one liked it

My work also became autobiographical.

And then another thing happened

A very close friend of mine came out as gay, and it was illegal to be gay in India at the time, and people's reactions to gay people were pretty terrible.

that was very annoying to me

I remember my mother used to dress me in girls' clothes, that was me, she wanted a daughter, but she only gave birth to boys.

(Laughter) I don't know what my friends will say later.

Please keep it to yourself

And after this incident, my work became a little more violent.

Masculinity you don't need to show

I put the weakness of men into my work

During this period, not only did collectors of my work disappear, but I was also banned from exhibiting due to political moves and threats to ban my work.

The wind got stronger and I got a little scared

Under terrible threats and unable to do anything

I thought it would be the end, so I went back to my hometown.

I thought I'd try something different [Fourth appearance: Household man]

I wanted to be reborn [Fourth appearance: Household man]

If you have children, you know that the best way to start a new life is to have children.

I decided to have children, but before I did, I did a quick do-and-not do research.

What causes families to fail?

And Rudra was born

my son

Two miracles have happened since he was born.

First, my mother made a miraculous recovery after major surgery, and then this man was elected President of the United States.

watching tv at home

With tears in my eyes, I said I want to live there in the future.

Netra and I decided to sort things out, put everything away, and move to New York.

that was eight months ago

After I came back to NY, my style changed.

My work has become eccentric in all respects.

This is "What was I thinking?"

It's a work about spiritual incest.

I may look like a nice, clean young man, but

But no, you can imagine anything

I'm acting properly as a citizen, though.

(Laughter) This is another piece.

I have one last thing to tell you.

I was talking to my parents this morning, and my dad said, "I know you have a lot to talk about, but talk about what you do with the kids."

I replied that I understand

I work with children all over the world, and I'd like to conclude by telling you about one event that has had a huge impact on me, which is completely different from the topic of this talk.

I met a 16-year-old girl named Belinda.

i was 17

When I was in Australia, I was told that Belinda had cancer and that she wouldn't have much longer.

I have 3 more weeks to live

I walked into the room and there was this shy girl because all her hair was falling out and she tried to hide it.

I took out my pen and drew a crown on her head.

And then we started talking, and we had a great time, telling stories about how I got to Australia, backpacking, cheating, getting tickets, everything.

I drew them

then i left

Belinda passed away, just days before she died, her book was published with my drawing on the cover of the book.

It was accompanied by the words, "Thank you for showing me the world on your rag magic carpet."

For me art is a magic carpet

I want you to ride this with me, interact with the kids, and be honest.

thank you

(applause)

A lot of people talk about happiness these days

I asked someone to count the number of books with the word "happiness" in the title that had been published in the last five years, and it was so overwhelming that I gave up after about 40.

Researchers' interest in well-being is growing considerably.

A lot of happiness coaching is also done

I know you want everyone to be happy

But despite all that effort, there are some cognitive traps that make it nearly impossible to think clearly about happiness.

Today we're going to take up this cognitive trap.

This applies to ordinary people who want their own happiness, and to scholars who pursue happiness, because everyone is in a state of confusion.

One of the traps is our reluctance to admit complexity.

It's become clear that the word happiness is no longer a useful word, because we apply it to too many things.

The term has specific connotations, but in general, we have to give up narrow confines and take a more complicated view of what a state of well-being is.

The second trap is to confuse experience with memory, the difference between the happiness you find in life and the degree of happiness in your life.

These are two very different concepts, but both tend to be lumped together into one notion of happiness.

The third is to focus on the illusion, and it's a shame that we distort the circumstances that determine our state of well-being.

This is just a cognitive trap.

there is no way to understand exactly

To give you an example, in the Q&A session after my lecture, one person told me, "He was listening to a symphony, and he was falling in love with the music, and there was a deafening sound at the end of the piece. He was quite emotional.

I said the song was ruined, but it was ruined by

It's not a song, it's a memory of the experience

he has a great song

I listened for 20 minutes

it lost its value

Because he was left with ruined memories. All he had left were memories.

I find that it seems to think of itself as two selves, the experiencing self.

It's a self that lives in the present and can go back in time. But basically it's only in the present.

The person you ask is the experiencing self, and there's the remembering self.

The remembering self records and tells the story of your life. For example, the questions that doctors ask are, "How are you doing these days?" "How was your trip?"

these two are completely different

It's the confusion in the notion of happiness that confuses the "experiencing self" with the "remembering self."

It's the narrator, the basic response of our memory.

It's going to start moving soon. When we talk, we're not just talking.

memory speaks

It's all about what's handed down from experience, and here's an example.

In a study done long ago

Data from real patients undergoing colonoscopies

The test is now painless

When the study was done in the 90s, it was a painful test, where patients were asked to report their pain level every 60 seconds.

this is two patients

It's a record of their pain.

when asked which

Clearly it's patient B.

His test time was longer, patient B felt more pain than patient A felt every minute, so I'll ask another question.

When I asked the patients themselves how much they thought they had suffered, surprisingly

than patient B

Patient A had more bad memories, and their test stories were different.

Because the most important part of the story is how the test ends, and neither of those stories are particularly poignant.

One is clearly more tragic than the other, the one described as a more unpleasant memory.

The pain was peaking right at the end of the day, which is really horrifying for the patient in question.

after examination and after a long time

I interviewed them, and when asked to rate their overall impression of the test, patient A said it was more difficult than patient B.

This is the experience self and

It's a stark contradiction between the remembering selves, from the perspective of the experiencing self.

It's clear that patient B had a harder time.

We've actually done a clinical trial, and it's been shown that it works by prolonging the colonoscopy by not moving Patient A's tube as much, and by doing so, the patient feels pain.

It's just a little pain, it's a lot less pain than it used to be, and if you do this for a few minutes,

It hurts patient A's experiencing self, but it's a much better treatment for patient A's remembering self, because the story of experience you give patient A is better. What makes up the story?

this through memory

It's common to the stories we remember and the stories we make up: change is what defines the story.

It's the defining moment, it's the ending, and the ending plays a very important role.

In this patient's case, the conclusion of the examination depended.

Life is seamless, every moment is one experience after another.

When I ask the whereabouts of "this moment"

the answer is very simple

lost forever most of the time in life

It's been said that the psychological present is about three seconds, and those three seconds are calculated about 600 million times in your life, about 600,000 times a month, and most of them don't leave a trace, most of them in your remembering self.

I'm ignored, but for some reason

We feel that the present moment has value, that what is happening in it is life, that we can experience while we are alive.

It's limited and how you spend your life

It feels like it has value, but this is not the story that the remembering self tells.

It's completely different from the experiencing self.

It's how we handle time. Let's look at it from the self's perspective of experience.

If you go on vacation, and if the first week and the second week are equally enjoyable, then two weeks of vacation feels twice as fulfilling as one week of vacation.

2 weeks vacation

It's not much different than a week's vacation, because it doesn't add any new memories, it doesn't change the story itself.

in this way

Time is a key point that distinguishes the Remembering Self from the Experiencing Self.

It works, and it's the remembering self that actually makes the decisions.

For example, if a patient who has had two colonoscopies by two different doctors is asked to choose which doctor to choose, the patient will choose the one that he or she remembers better when making this choice.

The experiencing self is not involved. Normally we don't choose from experience.

I pick from memory, even when I think about the future

We don't usually think of it as an experience, but as a proactive memory.

Seeing the future this is by the remembering self

Think of it as tyranny, where the remembering self decides to let the experiencing self experience things it didn't want it to experience.

I feel like when we go on vacation -- and that's the case most of the time -- we go on vacation for our remembered selves.

How many memories do we recall?

This is the memory self

Dominating - one of the explanations when you think about this

I remember my trip to Antarctica a few years ago, and it was probably the best trip I've ever been on, and I remember it more often than any other trip I've had, and that three-week trip.

In the last four years, I've probably recalled about 25 minutes, if 600 photos.

If I looked back, it would have added an hour for a three week trip.

It's a memory of an hour and a half at most, so it's somehow disproportionate.

I'm an average person

Maybe we don't recollect memories, but even if we access them more frequently, the real question remains: why should memory be so important as compared to experience? here

Let's do a thought experiment on your next vacation.

At the end of your vacation, when all your photos are deleted, you're put on an amnesiac drug and you have zero memory of your trip. Would you still choose that vacation? (smile)

If you take a different vacation, you have two selves in conflict, and you have to think about how to resolve that conflict, and it's really hard to see. If you prioritize time, you'll get one answer.

The choice between two selves is the problem we face.

Brings the idea of ​​happiness, which can be applied to two selves—

There is one concept of happiness, and the question that arises is, "How happy is the experiencing self?"

and “In the life of the experiencing self

How happy are you? ” What is the moment when you feel happy?

It's a very complex process. What are the measurable emotions?

Happiness felt by the experiencing self and

I hope you have understood the relationship of time, if you were to ask the happiness of the remembered self.

That's another thing, and it's not about how happy a person is.

when he thinks about his life

It's about how satisfied you are, which is a very different notion.

If you don't understand the difference between these concepts

Happiness research is going wrong.

The fact that memory self-satisfaction is different has been noticed in recent years, and there's now an effort to measure the two separately.

We've done polls all over the world, asking people what they think about their lives and their experiences, and along the lines of that, other research, more recently, about dual-self happiness.

We're just starting to figure it out, the main thing we've learned is

It's that the two are very different things.

From there, you can't tell how happy a person is with their lives, and vice versa.

The correlation is about 0.5, so if my father is 180 cm tall,

Even if someone said that, we don't know anything about his own height, although that would give us a little idea.

I don't know for sure.

Even if someone says your life is an 8 out of 10

We can't estimate how happy the Experiencing Self is, so the correlation is low.

Factors that govern happiness satisfaction

I know money is important

Goals are also important Happiness is mainly with people you love

It's about being content, spending time with people you love, and among other things, this one dominates.

So if you want to increase the happiness of your two selves,

You're going to be doing something completely different.

We shouldn't equate happiness with being physically and mentally healthy; they're two completely different ideas.

I will briefly explain here

Another reason why it's so complicated when we think about happiness is that we don't look at the same things when we think about life as we do in the days we live in. So if you ask people in California how happy they are,

You don't get the right answer when you ask that question to someone else

I think California should be happier, like people in Ohio. (Laughter)

What happens here is that when you think about living in California, you think about California in contrast to other places, like the different climates.

It doesn't matter to the Experiencing Self, which determines how happy a person is -- it doesn't matter as much to the Remembering Self, but it does, because the Remembering Self is in charge.

Some people move to California in the hope that they will be happy.

It's interesting to follow what happens to migrants when the experiencing self

It doesn't get any happier it's true

But what I can tell you for sure is that they will start to feel happier.

Because they remember how bad the weather was in Ohio, and they feel they made the right decision, and they want to stay healthy.

It's very hard to take things for granted. I hope you can see how hard it is. Thank you.

(applause)

Thank you I have a question Thank you very much

When we spoke on the phone a few weeks ago

You've given me some very interesting results that emerged from the polls, because I have time.

can you talk to me of course

The most interesting thing that the poll revealed was that

I didn't expect it to come up with a number about happiness as seen by the experiencing self.

It turns out that our emotions go hand in hand with our income.

It's something that's involved.

For Americans, under $60,000 a year is a survey of 600,000 people, so it's a typical sample.

oh yeah $60,000

(smile)

If you earn less than $60,000 a year, you feel miserable, and the less you earn, the more miserable you are.

It's rare to see such a flat line

Clearly what we can say here is

Money can't buy you experiential happiness, but it's the lack of money that makes you miserable.

It will be different. The more money you make, the more satisfaction you will have.

Emotions are not involved in this

But Americans try

Life, freedom, the pursuit of happiness, right? If everyone took the findings seriously

It feels like a 180-degree turn on everything we believe in, like the tax system, that politicians are taking this survey seriously.

Will there ever be a public policy movement based on this foundation? in public policy

I think research on happiness also has a place in the US to raise awareness.

No doubt it's going to take time, in the UK and other countries, where it's getting more recognition and thinking about public policy.

The need to put happiness in perspective is taken into account, and it takes time.

There will be a discussion about research into the experience of happiness, research into the evaluation of life, and we need that discussion soon, about how to increase happiness.

It depends on the person's way of thinking, and whether they think of the remembering self or the experiencing self, and this will have implications for policy going forward.

In America, the experiential happiness of all citizens

Efforts are being made to measure this within the next 10 to 20 years

I think this issue will be part of the next few years.

It's going to be the most interesting policy debate. Thank you for creating behavioral economics.

Thank you very much

So today, I'd like to talk to you about illusions, which I prepared for this TED talk, and I want to talk about it in relation to happiness. What I think about happiness, what gives it happiness? So what's happening is that if you go to a movie, and there's an unexpected, unexpected turn of events, something that you didn't expect to happen, and that's where you have a fun experience. , it's not fun, but let's do it anyway I'll introduce something as fun and as easy as possible It will make you feel happy

I'm going to show you a couple of ways that you're going to be disappointed. First, I'm going to show you an interesting illusion. You see two holes on this screen that you think are perpendicular to each other. change

Look again, I'm going to turn it around and put it back in. The people here are supposed to be smart people, aren't they? I can't get rid of the illusion. What is happening to me? Let's try it again It's the same Let's try it again It's still the same I can't do it It's difficult

In general, there are many ways that we can defy predictions, whether it's expressions, shapes, colors, etc., but they're very primitive. Now I have an interesting question. Why do we feel happy about these things? Why do we feel happy? So what I'm going to tell you is what Lionel did a while back, and I'm going to show you a little bit.

Again, it's not an optical illusion trick, as you can see, so it's not a camera cut, it's a perception trick.

Now, let's betray the predictions, the predictions about shape.

Predictions about presentation can also be subverted about what the image represents. What do you see?

How many of you can see the dolphins? Raise your hand. If you can see the dolphins, yes.

If you're a child under the age of 10, if you're an innocent child, you might look at this image and see a dolphin.

But if you reverse this part of the picture below, if you reverse this black part, I forgot the pointer, if you reverse this part, you see a little dolphin.

It's a Saatchi & Saatchi thing, but they actually did an ad like this in Australia, and if you look at this beer ad, the people in it look provocative.

Please don't forget this is my joke from the time the Florida vote was held. Count the points for Mr. Gore.

This is an outdoor watering hole that my friends and I built. It can stop a drop of water, but it can actually float any drop of water.

It's a still image Can you see it?

Does it look like the middle part is moving down and the outer part is moving up? completely still

It's a still image.Is there anyone who can see that this is an illusion? Complete still image

It's interesting, when we look at the image that we see, we look at the image, the color, the depth, the texture. We look at it as a whole and analyze it.

It's a nice trompe-l'oeil, and people who saw it talked to this woman and got annoyed because there was no response.

And sometimes we see the design wrong. This is a building in New York. From this angle, the balconies appear to be facing upwards.

Now look at this untouched photo. It's interesting. I get a lot of emails asking questions like, "Do men and women perceive differently?"

The answer is no. Women explore the world in the same way as men, exactly the same.

Now let's move on to the illusion design. The first intentional use of illusion was by Da Vinci, an anamorphic image of the eye. When you look at it from one angle, it looks like this.

This is an early example of the use of optical illusions, but it has become more widespread, most notably Hans Holbein's "Ambassadors", where he was in the service of Henry VIII.

Next, I'd like to introduce you to some designers who use illusions. They've tried to incorporate surprise as an element. My favorite is Scott Kim. I created an illusion with Kim that I made for TED.

Now, Arthur (Gunson) hasn't given a speech yet, but he's going to have a great speech. He's got a great machine.

This is analog and digital

characters disappear

this for musicians

It's about happiness, so we want "joy to the world"

Another great designer in Japan is Shigeo Fukuda. He's got some really good work here.

A pianist turns into a violinist

It's a really interesting piece, and it's a collection of forks, knives, spoons, and other cutlery fused together, the shadow of a motorcycle.

Ken Knowlton made some amazing composite images. For example, he made Jacques Cousteau out of seashells.

I'm running out of time, so I'm going to hurry up and show you my work. It's a new illusion. I created a Pixar-like illusion.

I'm looking in two directions at the same time. There's a big piece embedded in a small piece. I want you to think about it. It's impossible. Now I see two children, looking in two directions at the same time. Do you think these two tables have the same size and shape? that's right

If you measure it, you'll know for sure. As I said, these two are the same size and shape.

It's funny how powerful the illusion can be when you do it this way. It's always been a little bit of fun and I hope it brings you some happiness.

I'm going to give you an update from India about cricket, arguably the world's longest-running daytime soap opera.

This show keeps people going, it will last forever.

Like a soap opera, it has elements of love, joy, happiness, sadness, tears, laughter, lies and conspiracies.

And like a soap opera, it stayed that way for 20 years or so, until the audience's interests changed.

Thus cricket

After 20 years, it became a 20-over system

And I'm going to talk about how small changes can lead to big changes.

but this is not always the case

Cricket wasn't the fast game it is today.

There was a time when cricket was a "test match," with no time limit. It didn't end until a winner was decided.

A game in March 1939 started on March 3rd and ended on March 14th.

And it ended only because the British cricketer had to travel from Durban to Cape Town, two hours on the train, to make it in time for the ship on the 17th, because the next ship won't be here for a while.

The game ended in a draw

British batsman said

"If there were 30 minutes left, we would have won."

(Laughs) We've been fighting for 12 days, and we've got 30 minutes left.

During that time, there were two Sundays, and of course there were no games on those days, as we were going to church, and then there was one rainy day, and on that day, we all got along well.

Indians love cricket because it fits the rhythm of their lives.

(Laughter) Same with the epic Mahabharata.

After a day of fighting, everyone goes home when the sun goes down

Then strategize and fight the next day and go home

The difference between Mahabharata and cricket is that in cricket everyone comes back alive and the game is repeated.

The princes sponsored cricket, not because they loved it, but to please the British rulers.

Another reason Indians love cricket is because it has thick wooden boards, rubber balls, and it can be played with any number of people, anywhere.

Take a look. Whether it's a stone square or a narrow alley, it's so narrow that your bat hits the wall, so you have to be careful about the outdoor unit and wires.

(Laughter) You can do it on the banks of the Ganges River. The Ganges River is as beautiful as ever.

You can also play in a small area, although you won't know which game you were in.

(Laughter) Like this, you can play anywhere.

But slowly the game goes on and

We started a 50-over system because not everyone can keep going for 5 days.

Then something incredible happened

Sports in India didn't go according to plan, but a number of factors worked well together to create an incident.

won the 1983 World Cup

And suddenly everyone was hooked on 50 overgames, and they played it almost every day.

50-over cricket became more popular than any other country.

Another great thing happened

won the World Cup in 1983

In 1991-92, the Finance Minister and the Prime Minister showed their willingness to show the world that India would not remain a huge closed mystery.

Then recognize multinational corporations

We cut tariffs, we eased import taxes, and then multinationals poured in with their own budgets, saw per capita income, got excited about the potential in India, and sought ways to market it to all Indians.

There are two means - one is real, the other is scripted

To be scripted is to show it as a movie, and the real one is cricket.

The friend sitting in front of me now, Ravi Dalival of Pepsi, decided to take cricket around the world.

And that was the big change that brought cricket to the world.

Cricket then grew and began to bring wealth to India.

Cricket began to be broadcast on television.

We won't be playing cricket,' but he said, 'The rights to next season are $55 million.'

"That next season will be $612 million."

quite a change

another big thing happened

Britain invented 20-over cricket and said, let's play 20-overs in the world.

Just like England started cricket and spread it to the world.

Thank you

(Laughter) India participated in the T20 World Cup.

India was reluctant to

be cornered by an 8 to 1 difference

Something very dramatic happened there.

It's a moment that will go down in history until the final race.

(Cheers) The Pakistani hitter is going for a home run.

I got Jishan! India win!

what a match

india is the world champion

(Cheers) India is the T20 champion.

What a match Dhoni finished it Miss Barulhak was great too

We've done a feat. India is the T20 champion.

India suddenly started showing their strength in the 20-over.

It must have been a big mistake for the batter to wait for the pitcher's fastball.

(Laughter) If it had been a fastball, I would have hit it right, but it didn't, and we knew we could do well in this game.

It also gave me confidence that India is the best in the world.

It was a time when foreign investment was pouring in, and India was gaining a little confidence.

And it allowed us to take great pride in what we did well.

Thankfully, the British are very good at inventing things, and they've been generous enough to let the whole world take advantage of their inventions.

(Laughter) So the British built the T20 and allowed India to take over.

I didn't redesign it like I did in medicine, I took it as is.

(Laughter) We started our own T20 league.

6 weeks of city competition

It was a new attempt, and there are only two areas where Indians are proud to represent themselves on the field.

One is the war, the Indian army, the less the better.

the other was indian cricket

Now, all of a sudden, we had to support an inter-city league.

But the people involved in intercity leagues looked to the West as a model.

America is the holy land of leagues, isn't it?

But was India ready?

Cricket is part of the Indian tradition.

So there was no publicity, no team buying and selling.

See what happened to our beautiful, wonderful, simple family game

All of a sudden this started happening

(Music) It's been like this every time there's a match since the opening ceremony.

This is India, where we started buying Corvettes and Jaguars.

This is India, where monthly mobile phone signups are more than double the population of New Zealand.

So India has changed.

But there's also India that's slightly more traditional.

So when I saw the cheerleaders, I was stunned.

Everyone is secretly watching, but no one claims to be watching.

(Music) (Laughter) The new owners of Indian cricket are not princes.

Nor were the bureaucrats forced into a sport they didn't like. The new owners were business owners.

And we made cricket bigger, and we made club teams bigger.

they had a lot of money

So, before they actually started the league, the IPL had $2.3 billion, $1.6 billion from over a decade of TV revenue, and over $70 million from franchises, and then they had to advertise to each city, and they also had to do things the way they do in the West, because they're launching a league.

But they were very good at bringing out the local color.

Let me give you an example of how they did it, Mumbai style, not Manchester United style.

(Music) A lot of people said, "Maybe I'm better at dancing than I'm at cricket."

(Laughter) That's okay. It's changed the way I look at cricket.

For a long time, if I wanted a young cricketer, I would look for it in my hometown, in my city, and I was very proud of the system for finding cricketers that way.

Now suddenly, if you play cricket, if Mumbai is playing, you don't have to go to Kalbadevi or Shivaji Park to find players, you can go to Trinidad.

Don't you think it's the new India? It's a new world where you can find players anywhere, if you can get the best players for the cheapest price.

And suddenly, Indian sports woke up to the reality that the best players could come from anywhere in the world at the highest salaries.

The Mumbai Indians took Dwayne Bravo on an overnight flight from Trinidad and Tobago, and when they brought him back to play for the West Indies, they asked, "When do you need to arrive?"

He said, "I have to leave today."

This one said, "No, no, it's the day of arrival, not the day of departure."

so he told me the date he should arrive

They said, "Okay, play until the day before."

He played in Hyderabad, and immediately after the game, he flew from the stadium to Hyderabad airport, boarded the company's private jet, refueled in Portugal, refueled a second time in Brazil, and arrived in the West Indies on time.

(Laughter) It's on a scale that's never been thought of before.

India never said, "I want a player to play one game, and then I want to send him on a company plane to Kingston, Jamaica for another game."

I said, 'Have I reached a new world?

It's a different world, the scale is different," I thought.

But what this resulted in was that the two most important elements of Indian cricket were the fusion of cricket and Indian entertainment cinema.

cricket and cinema were two different things

But now movie stars are starting to own club teams.

People started going to cricket matches to see Preity Zinta.

I'm going to cricket to see Shah Rukh Khan

and something very interesting happened

Cricket in India began to sing and dance.

That's why it's more like Indian cinema.

Of course, if you're on Priity Zinta's team, as you can see in the next video, if you play well, you can hug Priity Zinta.

This is the ultimate reason why you score so high.

(music) And then Shah Rukh appeared to the audience in Kolkata.

We've all seen games in Kolkata, but we've never seen anything like this, Shah Rukh, with Bengali songs, motivating the whole crowd, not for India, but for Kolkata.

please see this

(Music) An Indian movie star is hugging a Pakistani cricketer because he won in Kolkata.

can you think of this

What the Pakistani player said

(Applause) "I wish I had played for the Preity Zinta team."

(Laughter) I'm sure some of you have come from Pakistan to take this opportunity.

I am very happy that you are here. We will get along well and become friends together.

If we can play cricket together, we are friends.

Thank you for coming from Pakistan

(Applause) And there are criticisms, because they say, 'Are players for sale?

Grain or

cow

because there are auctions like this

How are player salaries determined?

And in the next auction video, he actually says, "Millions of dollars to players."

Have a look at this

(music) $1.5 million Chennai

Shane Warne is finalized for $450,000.

Players used to earn 50 rupees a day for one game, 250 rupees for a five-day "test match", and only 200 rupees for four days.

The best player in every "test match" - the benchmark contract for the top player in any international game was $220,000 for one year.

I've played six days now, and it's $500,000.

Andrew Flintoff from England made $1.5 million, and he said, "I'm making more than any football player who made more than Frank Lampard or Steven Gerald in four weeks."

Where do you earn money? A small club team in India.

Did you imagine that such a day would come

$1.5 million for six weeks of work.

not bad

$2.3 billion, before the league actually started.

What India was trying to do was set the standard for India in the world and become a big brand.

Lalit Modi graced the cover of a business magazine.

The Indian Premier League is India's biggest brand, and given the domestic elections, it had to move to South Africa and start a three-week tournament.

We moved all three weeks of tournaments to South Africa.

do you know why

No country prepares more slowly than India for the three weeks before the event begins, and no country works more quickly in the last three weeks than India.

(Applause) Our people have been a problem for a long time, but suddenly they're our greatest asset. Many people watch the game, it's a huge consumer base.

We also made cricket the only sport in India, and unfortunately, in India, other sports are pushing cricket to become bigger, which is a bit of a tragedy.

There's only about a minute left, and there are some of these side effects.

For a long time, India was a country of poverty, garbage, beggars, snake charmers, filth, and stomach pains.

And then suddenly, India became a land of opportunity.

Cricketers all over the world say, "I love India. I can't wait to play in India."

aren't you happy

We say, "because the dollar is getting pretty strong."

Can you think of it? We have an image of money and no longer an image of guts.

There is no image of filth or begging. Snake charmers are gone.

India finally took the game from England, but T20 will be the next cricket evangelist.

If you want a sport to be popular all over the world, make the sport's shortest form popular.

We can't have a match against China without a result for 14 days, otherwise it wouldn't be popular all over the world.

T20 is such an event

Hopefully it will make you richer and the game bigger and more jobs for cricket commentators.

thank you

(applause)

If I can give you one big idea today, it's that what we get from the totality of the data is more than the sum of its parts. Instead of information overload, think about how you can find patterns and trends that you don't normally see.

What you're looking at right now is a typical graph of mortality by age.

The tool I'm using right now is experimental.

Pivot. This allows you to extract only data for a specific cause of death. For example an accident.

And you can immediately see another trend.

The reason is that here, in the middle, people are the most active, and then on this side they are the weakest.

You can go back and sort the data by cause of death, which is highest for cardiovascular disease and cancer, but not for everyone.

Let's narrow it down further by age, and look at people under 40. You see that accidents are the number one cause of death for people in that age group.

You can also see that men especially need attention.

Now, I hope you all understand that looking at information and data in this way is like swimming in image-based information.

And if you can do this with raw data, why not do it with your content?

So here are the Sports Illustrated magazine covers that have ever been made.

Everything is here on the web.

You can do the same in your room after the performance.

You can narrow down to a specific decade in Pivot.

You can also narrow down to one year.

Instantly return to any volume.

Let's see this. All athletes featured in this issue are displayed.

If you're a fan of Lance Armstrong, click here. Then all the issues where Lance Armstrong was featured like this will be extracted.

(Applause) Let's say you want to take a moment to look up.

Take a step back and expand.

Then Greg Lemon comes out.

I hope you have understood that freely manipulating information by narrowing down, expanding, and going back in this way is not just a simple search or browsing.

This is actually a little different.

I think this will change the way we use information, halfway between searching and browsing.

Let's extend this idea to do something a little more extreme.

We have summarized every page on Wikipedia into a small summary.

A summary consists of a short synopsis and an icon representing the topic to which it belongs.

Right now we only list the most popular 500 pages.

But even within this limited range, we can do a lot.

In no time you'll have a grasp of popular topics on Wikipedia.

I'm going to choose "politics" from now on.

Now, if we select "Politics", we can see that the Wikipedia category with the most matches is Person of the Year from Time magazine.

This is very important because it is information that is not included on any Wikipedia page.

This perspective is only possible when you step back and look at everything.

Let's take a look at one of the summaries From there you can go to the Person of the Year category and view everything that belongs to it.

So look at them, you can see that a lot of them are political. Some are related to the natural sciences. Even fewer, but there are also business people. I have my boss too. Then there is one person in the music field.

And interestingly, Bono is also a TED Prize winner. like this

You can freely look around all the TED Prize winners.

As you can see, for the first time we're navigating the web as a web, not from page to page, but at a high level of abstraction.

So I'd like to show you one more thing that might surprise you.

Here is the homepage of the New York Times.

So this application Pivot--I don't want to call it a browser. Because it's different. But of course you can browse the web--we've made zoom technology available to each web page like this.

You can step back, take a look, and dive right into the part you want.

Now, the reason this is important is that by browsing the web in this way, you can see your entire browsing history in exactly the same way.

So you can drill down into what you did at a specific time.

In fact, here you can see the history of the pages we demonstrated today.

Then you can replay what I just showed you.

If you want to step back and see everything, you can slice and dice the history, for example you can retrieve your search history. I am searching for a relative.

From that history, you can quickly trace back and restart.

One metaphor appears over and over again in different forms. That is, the whole is greater than the sum of its parts.

Today, we perceive the data flooding the world as evil.

Information overload is a disaster

It is said that we are drowning in information.

Can we turn it upside down? If you turn the web upside down and get used to moving from lot to lot rather than simply moving from one thing to the next, you'll begin to see patterns you didn't see before.

If this is possible, it may be possible to extract appropriate information rather than being buried in data.

Then you can extract knowledge rather than just process information.

If you can draw out that knowledge, you may be able to find wisdom.

that's all. thank you.

(applause)

i grew up in sci fi

When I was in high school, I used to commute by bus for an hour each way.

I was always immersed in books, sci-fi books that transported my mind to other worlds and filled my insatiable curiosity in the form of stories.

Curiosity manifested itself in other ways, and whenever I wasn't in school, I would go hiking in the woods and collect specimens -- frogs, snakes, bugs, pond water -- and I would bring them back and look under a microscope.

You were a science geek

It was all about wanting to understand the world, wanting to know the limits of what's possible.

And my love of science fiction seemed to be reflected in the real world as well, in the late '60s, when humans were heading to the moon and exploring the deep sea.

It was also the time when Jacques Cousteau specials aired, showing us amazing creatures and sights we had never imagined.

Those sci-fi aspects must have resonated with me.

I was also an artist

I can draw sketches and pictures

There weren't video games back then, and movies and media weren't flooded with CG like they are today, so I had to imagine it myself.

We've all done that, haven't we? We read books, and from the descriptions we drew these thoughts on our mental screens.

I imagined aliens, otherworldly things, robots, spaceships.

In class, I was scolded every time I was caught scribbling on my textbook.

After all, imagination needs an outlet, doesn't it?

Interestingly enough, when Jacques Cousteau told me that there was another world on this planet, I was really excited.

It's unlikely that I'll go to another world on a spaceship.

But it turns out that there's a world out there on Earth that's as rich and fascinating as the books I imagined.

So I decided to become a diver when I was 15.

The only problem was that I live in rural Canada, 1,000 kilometers from the ocean.

But I didn't get discouraged

I pestered my dad to find me a diving school in Buffalo, New York, just across the border.

And I actually got my license in the middle of winter at the pool at the YMCA in New York.

And for the next two years, I didn't even see the real ocean until I moved to California.

Over the next 40 years, I spent about 3,000 hours underwater, 500 of those hours in submersibles.

What I've learned is that even the deepest and shallowest oceans are full of amazing creatures beyond our wildest imagination.

Nature's imagination is truly limitless compared to the meager imagination of mankind.

I am still in awe of what I see underwater.

My passion for the sea has always been the same.

But when I grew up, my career of choice was filmmaking.

I thought it would reconcile the urge to tell a story with the urge to create images.

I used to draw cartoons all the time when I was a kid.

Filmmaking allows you to bring the image and the story together, which was ideal.

And, of course, the stories I chose were sci-fi: "Terminator," "Aliens," and "Abyss."

"The Abyss" put my love of the sea and diving into the making of the film.

Combining two passions

"The Abyss" yielded an interesting take. I needed a solution to the filming of one scene, and I needed to create a creature that looked like water.

As a result, it became the first movie character to use soft-surface CG animation.

It was a movie that didn't make any money at all, but let's just say a ton of it.

It's the Arthur Clarke Law: "Sufficiently advanced technology is indistinguishable from magic."

The audience seemed to see magic

I was thrilled with the reaction

I thought, "I have to adopt this as a method of video expression!"

So in my next film, "Terminator 2," I took it even further.

We partnered with ILM to create a liquid metal character, and the film's success hinged on its special effects hitting the mark.

And it worked. It was magic again. The audience was just as good as last time.

I thought that combining two different experiences would open up a whole new world, a world of imagination for filmmakers never before seen.

So I started a company called Digital Domain with Stan Winston, who was a leading creature designer and makeup artist at the time.

The company's concept was to make analog processes like optical printers obsolete, and make a leap to digital production.

We did it, and we led the industry for a while.

In the mid-'90s, we fell behind in monster and character design, even though that's what the company was for.

That's why I wrote "Avatar." It was about pushing the boundaries of special effects and CG, and using CG characters that were as emotionally rich as humans.

But the limits were quickly pushed back.

So I put it on hold and made a movie about a big ship sinking.

(Laughter) I pitched to the movie companies, "This is Romeo and Juliet on a ship."

But secretly, my plan was to dive and see the real Titanic.

That's why I made this movie

(Laughter) It's true, but I can't tell the production company.

So I persuaded him by saying, "Let's shoot the real Titanic."

"I use it in the opening of the movie."

"It's a great publicity stunt."

And we even talked about the cost of the search.

(Laughter) You're crazy, but this brings me back to the theme of imagination creating reality.

Because six months later, we were actually on a Russian submersible, 4,000 meters deep in the North Atlantic Ocean, watching the real Titanic.

It's not movies, it's not TV, it's reality.

(Applause) Everything was overwhelming.

It was difficult from the preparation stage. I made everything from the camera to the lighting.

What struck me was how deep-sea diving felt like an activity in space.

It's a highly specialized field and requires a lot of preparation.

If you shut yourself up in a small capsule and can't return on your own, you're headed for a desperate, dark world.

I thought, "It's like being in a sci-fi movie."

"This is amazing"

And I became a prisoner of deep sea exploration

I was fascinated by the strangeness and the scientific side of it.

It was an experience you couldn't get in Hollywood.

I can imagine creatures and create them with special effects, but I couldn't even imagine what it was through the window.

As I continued to explore, I saw creatures living in hydrothermal vents, discovered and photographed things I'd never seen before, and things no one had ever seen before, things that science at the time couldn't explain.

I was totally hooked and I couldn't stop

So I made a strange decision

After the success of "Titanic," he said, "I'm taking a break from my job as a Hollywood filmmaker. I'm going to be an explorer for a while."

and began to develop a plan of exploration.

As a result, the battleship Bismarck was explored by a robotic submarine.

Then back to the Titanic, this time

They built a little robot with fiber optics and brought it in.

To investigate the interior of the ship, which was still shrouded in mystery at the time.

Until then, we didn't have the means and nobody could get in, so we developed the technology to do that.

I was in a submarine on the deck of the Titanic, and there was a stage that looked just like this, and it was where that band was playing.

I was piloting a small robotic submersible, navigating the corridors of the ship.

I said I was piloting it, but my heart was in that robot.

It felt like I was really inside the wrecked Titanic.

And I had a surreal déjà vu like never before, and I knew what I could see before the robotic submarine's lights flashed down the hallway, because I'd spent months walking through the set while shooting the movie.

The set was a complete replica of the Titanic blueprints.

this was a really amazing experience

I realized that when I used a robotic avatar like this to experience remote immersion, my consciousness could transfer to the avatar, change shape, and survive.

It was a very deep experience.

Perhaps, as a sci-fi fan, I might have caught a glimpse of the "post-human world," which will come decades from now when humans take on cyborg bodies for exploration and other purposes.

Through these expeditions, I've come to understand the wonders of the deep ocean, the hydrothermal vents on the ocean floor, and the strange creatures that live there. They're like aliens living on Earth.

We live by chemosynthesis

You can't live in a photosynthesis-based ecosystem.

I've seen animals living beside a water column of 500 degrees Celsius.

don't you think it's impossible

At the same time, I developed a strong interest in space science, again influenced by science fiction as a child.

Eventually, I got connected to the space community, got involved with NASA, was on the Advisory Board, did the actual space program, participated in the preflight biopsy in Russia and all sorts of things, and even planned to actually board the space station with our 3D camera system.

was very attractive

But then I found myself guiding space scientists to the deep sea.

Astrobiologists, planetologists, people interested in extreme environments, we took them to hydrothermal vents to take samples, test equipment, and so on.

It was filming a documentary, but it was actually working on space science.

I've completely closed the loop, and this boy who was a sci-fi fan as a kid is making it a reality.

And I learned a lot on this journey of discovery.

I learned a lot about science, but I also learned a lot about leadership.

You might think of a director as a leader, like a captain of a ship.

I didn't understand leadership until I did these explorations.

At some point, I thought, "What am I doing here?

why are you doing what do you get ”

This kind of show doesn't make money

No profit, no fame

People thought I was polishing my nails at a resort somewhere between "Titanic" and "Avatar."

I shot these documentaries, but they're for a very limited audience.

No fame, no glory, no money What am I doing?

It's for the very task, for the challenge. There's no environment more challenging than the ocean, and you do it for the thrill of discovery and the strange bond that teams form when they come together.

These jobs take teams of about 10 people and span many years, sometimes spending two or three months at sea.

I've come to realize that the most important thing in this bond is respect for each other, and respect for each of us for overcoming challenges that no one else can explain.

When I get on land, I say, how is the optical fiber, how is the attenuation, this and that, this and that, the technical aspects and difficulties, the human aspect of working at sea.

Creates a bond of respect

When I came back to shoot my next movie, which was "Avatar," I brought the same leadership ethos and tried to respect the team and earn their respect.

This really changed the driving force

Once again, I set out with a small team to create "Avatar," using technology that hadn't existed before in uncharted territory.

very exciting

it was a tremendous challenge

And after four and a half years, we became a family.

My Filmmaking Has Completely Changed

People say I've done a good job of fitting sea creatures to the planet Pandora.

For me, what's changed is the basic way we work, and this is the result.

So what can we derive from this?

what is the lesson

first of all, curiosity

the most powerful thing you have

Imagination actually has the power to evoke reality

And respect from the team is more important than any honor in the world.

A young filmmaker asked me for advice.

He said, "Don't limit yourself

That's what people around you do Don't think you can't do it yourself Don't be willing to take risks

NASA has a favorite saying: "Failure is not an option."

But in art and exploration, it should be an option, believe it and dive in.

All innovative endeavors have been carried out at risk.

You should take this risk yourself.

Finally, I would like to say that no matter what you do, failure is an option, and fear is not an option. Thank you.

(applause)

(Music) (Applause) I'm John M. Chu. I'm not a dancer, I'm not a choreographer, I'm a filmmaker, I'm a storyteller.

I made a movie called "Step Up 2: The Streets" two years ago.

Hey did you see saw? Yay!

During the shoot, I met a lot of hip-hop dancers, some of the best in the world, and they brought me into underground street culture and I was blown away.

These are people with truly superhuman strength and abilities.

Jump in the air and bend your elbows in the opposite direction

I spin my head 80 times in a row

I've never seen anything like that

My heroes growing up were Fred Astaire, Gene Kelly and Michael Jackson.

We were a family of musical lovers.

(Laughter) They were the ultimate heroes.

It made the low self-esteem little shy Asian kid from Silicon Valley believe in great things.

They made me think, "I'm going to moonwalk for her on Bar-mitzvah night."

(Applause) And then those dance heroes seemed to disappear, completely overshadowed by pop stars and music videos.

But what I saw told me they hadn't disappeared at all

They are alive and well and are improving day by day.

The dance itself is progressing

The current dance is already flying

Technology is dance's best friend

social network for online video

Dancers now have a global dance laboratory, where a young Japanese kid can learn a move from a YouTube video made in Detroit, and in a matter of days, add something new to it and publish it, and a Californian teen can remix it with Philly Flair to create a whole new dance style.

That's what happens every day

It's in those nurseries, living rooms and garages, using cheap webcams, that the world's greatest dancers of tomorrow are born.

Our Fred Astaire, Gene Kelly, and Michael Jackson are within reach. Others may not have the opportunity.

So we created LXD, a kind of transcendental dance collective, a dance all-star hero team, people who believe that dance can change the world.

They're living, breathing comic books, but unlike Spider-Man or Iron Man, they're real.

Today we're going to take a look at some of them. Let me introduce you to our heroes.

Mad Chad Lil C Kid David J. Smooth

Come on, get excited and have fun, please shout

Everyone this is LXD

(Applause) (Mad Chad) People who see me for the first time have so many different reactions.

Kids love it, and some people get really excited about it.

I'm happy for their reaction

Mudd Chad - Master of Mechanical Movement "When I dance, I want to make people wonder if what they're seeing is real." - Mud Chad (J. Smooth) When I'm in the zone, I dance freely, imagining visual lines and making them move.

I'm imagining something like a Transformer The panel opens like this, folds up, puts it inside, and closes the panel

Then another one opens and closes

J. Smooth - Master of precision movement "The details are everything and every move I make makes sense" - J. Smooth (Kid David) When I'm dancing I honestly don't know what's going on

When I'm doing it, it's really just my body and the music

It's not like I'm consciously thinking, "Next time I'll do this and do that."

I'm on another level I can't choose anymore It's just my body reacting to the sounds in the music

I got my name because I was a kid

I was a kid when I started, everyone I danced with was older than me

That's why people always called me Kid David because I'm a kid

Kid David - Breakboy "It's not what you do, it's how you do it" - Kid David (Lil C) Tell me to get a ball Use that ball of energy

Everyone thinks it's a crump that throws it out, it's a crump move

But it's not a clamp Throw it out Throw it out and hold on

Let it go, then catch it the moment it sees its tail and pull it back

And grab this ball of energy and manipulate it

Create power and tame it Lil C - King of Crump

“I try to balance weight and energy and space and time.” — Lil C Choreography Christopher Scott Harry Shum Jr. (Applause)

I can see what you should be, and that means that when you wake up in the morning, you're just who you are, and your blood boils in what you're doing, and you literally get down on your knees, out of gratitude for the wonderful good fortune that's been bestowed upon you as you go through the day, and you're glowing brightly over and over again as you go through the day.

If your life isn't like this, let me presume that you're wasting your life.

There's no time to waste in life

Now, in the remaining 17 minutes -- you've already spent a minute -- I'm going to show you a very useful way to make sure you're like that.

Are you interested in?

(Audience) Yes

I understand

Happiness is the theme of today's conference. Even if it's not, everyone here is dedicating their entire lives to being happy, in whatever way or form, isn't it?

Whether it's your job, your family, your kids, your love life, what you're doing is the pursuit of happiness.

That's right

Think about it, what do you have to have to be happy?

let's take a moment to think

what do i need to get to be happy

Anyone got an idea?

When I ask this question, I get a lot of answers: great wealth, an attractive spouse, good health, a lot of travel experience, time, and so on.

If you were thinking the same thing, you probably have a list of what you need to be happy.

I want you to think, whatever you can get -- whatever you can get, you can let go.

May I

A lot of money makes people happy, but a lot of money can disappear overnight.

People in the financial field already know

Even if you can get something and be happy, it might go away

What will happen to you then?

It's not that good

I have another suggestion for you

What I want to suggest to you is that you don't have to have anything or do anything or be anything to be happy.

I repeat, there is no what you should have or what you should do or what you should be in order to be happy.

In fact, happiness is a quality you were born with.

It's built into you, it's like part of your DNA.

I can't afford to be unhappy.

Everyone here is kind, but when I give a talk at a prestigious business school, it's not easy.

Invariably, someone speaks for a lot of people and says, "If happiness is inside me, why haven't I experienced it?

Why is my life the worst?"

(Laughter) The answer is actually very simple.

You spend your life learning to be unhappy.

I repeat, you spend your life being unhappy.

When it comes to how we learn to be unhappy, we believe in certain mental models.

Mental models are the ideas we have about how things should be.

We all have mental models, and many of them.

How to find a job, how to get promoted, how to choose a restaurant, where to go to the movies, etc.

There are many mental models, the problem is not having one

It's not knowing that you have a mental model.

we think the world is

The more I focus on mental models, the more I realize that this is how the world works.

But that's not it. It's just a mental model. There's a mental model that we strongly believe is that in order to do something and be something, you have to have something.

For example, you have to travel to fascinating places and make a lot of money to be happy.

Like you have to be in a relationship to have great sex and be happy

They're based on the "what if" mental model.

The "what if...then" model is the idea that if this happens, we can be happy.

If I got a good job, if I made more money, if my boss had a heart attack, if I was married, if my wife died (Laughter), if I had kids, if they grew up and went to college, and so on.

I don't mind anything

It is to think that if this happens, you will be happy

For all of you here, the one thing that's different is what your individual "what ifs" are.

The only difference between you today and 10 years ago is what the "what if" was your focus.

Try to remember yourself 10 years ago

take a minute

If you remember clearly 10 years ago, there must have been something you wanted.

That's right

I'm sure you already have many of the things you wanted 10 years ago.

is it right

What are the results?

Exactly the same situation

we don't realize there's a problem with the model itself

The mental model of "This will make me happy" is wrong.

Instead of acknowledging that the model itself is wrong, we spend an enormous amount of time changing the "what if".

"I thought it would be nice if I could be president, but I realized that I didn't just want to be president.

I want to be a billionaire president, so I can be happy."

you have your own model of this

But the model itself is wrong, and it doesn't matter what the word that follows the "if" is.

let me explain

Have you ever had such an experience where you were completely different from your usual self in front of an exquisitely beautiful sight and placed yourself in a great tranquility?

It could be a rainbow, a mountain range, a valley or an ocean.

Please raise your hand if you have any idea

Almost everyone

Have you ever wondered why this happened?

The reason it happened is because by chance, for some reason, you accepted the world as it is in that moment.

I wouldn't have said this, "It's a beautiful rainbow, but it's a little off to the left. If I could move it to the right about 200 meters, it would be even more beautiful."

(Laughter) "It's a beautiful canyon, but the tree branches in front of it are too curved. If I had a chainsaw and 20 minutes,

I wouldn't have said "I could make it look better"

It doesn't matter if the rainbow isn't centered

Even a tree with crooked branches is perfectly fine

The moment you accepted the world as it was, your habitual desires disappeared and your innate happiness emerged, and you felt it.

I say that because you still remember it, even years after that experience.

Now, you have problems in your life, or more precisely, you think you have problems, but your life is just as perfect.

but you don't accept it

On the contrary, I'm doing everything in my power to try and change that.

I am not willing to accept

And when you don't accept the problem, you adopt a mental model that says, "If this were the case, I'd be happy."

But there's a problem with that model

Let me show you how you can get out of that mental model, or at least move towards it.

I will tell you what to do

We all go through life trying to achieve something, right?

We are here to get something

Alex wishes the conference every success.

I'm sure many of you also want to have a successful program for your company.

I want to grow I want more money

Those are the "results", what you want them to be

Now think about this: You can control your behavior, and this applies to most, if not all, of your actions.

You have no control over the results

May I

You can control your own behavior

You have no control over the results

Have you ever had a goal and started working towards it only to find that you didn't achieve it, or that the result was the exact opposite of what you envisioned?

Have you ever had such an experience?

A friend of mine was one of those people and said something like, "Well, I haven't paid much attention to my wife until now, so I'm going to have to reflect on it."

Later, when we went on a business trip together, he bought an expensive dress for his wife.

I thought it was his way of showing affection and that something good would happen.

When he gave it to his wife, her reaction was, "You've been married for 20 years and you don't know my dress size?"

(Laughter) "Furthermore, don't you know that this is not my hobby?"

It was the harbinger of a terrible marital quarrel.

Have you had a similar experience?

Have you ever taken action for a certain result, but the result was the exact opposite of what you wanted?

this is a common occurrence

We live in a world where everything we think about and put our hearts into is results.

We define life as being here now, this is where you want to go, there are steps to get from where you are to where you want to go, and if you succeed, life is great.

If you don't succeed, you're a failure and your life is bad, it's the worst.

Correct?

this is how we live

We're focused on results, and as I've pointed out, the results are often not what we wanted, sometimes the exact opposite of what we wanted.

When you focus on results, what you're guaranteed is undue frustration, anger, and other things that make life worse.

there is another option

It's about focusing less on the outcome and more on the process.

The best way to describe this is by John Wooden.

I don't know how many of you know John Wooden.

He's very famous in America, especially among basketball fans.

He's the only player and coach to be inducted into the Basketball Hall of Fame.

He told his team that he led UCLA to an unprecedented number of victories in the NCAA tournament, but he often told new teams that it wasn't about winning.

"When the game is over, look at yourself in the mirror. Did you perform to the best of your ability?

If you've performed to the best of your ability, the score doesn't matter

But if you use your abilities to the fullest, your score will probably be exactly what you want."

That's what it means to focus on the process.

what we do is the exact opposite

we focus on results

This is what I want to get I definitely want to get it Because it will make me happy

And we try to do whatever we can, but what you always look at is, "This is the result."

It's okay to focus on results

I know the way to go

But focusing on results means making sure your happiness depends on achieving certain results.

This is clearly a source of failure

can't you do something else

you can focus on the process

In other words, decide where you are now and where you want to go.

When there is a step I want to take, I will do my best for it

if it succeeds that would be great

And if you don't succeed, that's also great, because now you've come to a new starting point, and from that new starting point, you can choose a different outcome and go for it.

If you do that, you'll feel great every day

Let me give you an example

Raise your hand if you have children

Have you ever seen a small child trying to walk for the first time?

Usually between the ages of 11 and 13 months, the child gets up and sees everyone else walking around him, and he wants to walk, so he gets up, he falls and starts crying, and his mother runs up to him, he falls, he kisses where he hit him, and soothes him.

The child tries to walk again and falls, the mother runs up

After repeating this a few times, the mother gets tired and doesn't run anymore, the child stops crying, gets up again and takes another step, this time without falling, takes another step, and a beautiful smile appears on the child's face.

Soon, usually in less than 24 hours, he'll be walking around and making a mess of the living room.

That's when I realized that parenting entered a new phase.

That's right?

Now imagine that every time that child fell, he said, "I've already fallen again.

I will never be able to walk for the rest of my life."

You soothe him.

How long would it take you to walk like that? Every third run, you hire a counselor to give you counseling.

It's funny

But that's what we do

the child is focused on the process

The child is focused on the process, not the outcome.

what we do is the exact opposite

As we grow, we become less focused on the process, more focused on the outcome.

You essentially have no control over the outcome, and if you put all your mental energy into it, you'll wear yourself out along the way.

If, on the other hand, you say, "This is the result, let's focus on the process and try as hard as we can," every day will be more fulfilling and closer to what I'm talking about.

People often ask me, "Professor Rao, I don't have anything I'm passionate about."

When I asked, "So what do you want?"

I will almost certainly give you a list

What is your ideal job, how much does it make, who is your boss, who are your co-workers, who are your customers, how often do you travel, how big is your office, how thick is your carpet, how many windows, how many yardsticks?

The first thing I tell them is that there is no such thing.

And then if they exist and you're happy with them, in less than six months you're going to be feeling the same misery you're feeling now, because passion is inside you.

not present at work

If you can't find a way to ignite the passion that's inside of you right now, then you can't find it anywhere else.

If you can find a way to ignite your passion in its own way, the world around you will change as you try to change.

As you do so, you'll also discover that miracles often happen.

meet someone you want to meet

have a meeting with someone new

It's easy, because what you should do in life is experience.

You attended this conference This is an experience

You hang around the break room and talk about how bad your company is, and that's an experience.

Watch Desperate Housewives It's an experience

It's an experience where women in their 40s flirt with gardeners who are 19 or so, and their husbands play with their models.

it's all about experience

No problem, but ask yourself, "Is this the experience I want to have?

Will this lead me where I want to spend my time?"

If you start asking that question, you should be able to feel the change in your life.

Who you meet, what you talk about, what movies you watch, what books you read, everything changes.

Focusing on the process initiates those changes.

Focus on the process, not the result

thank you

Last year I was here at TED asking you to put your data out there, put it on the web -- government data, scientific data, community data -- whatever data you put on the web, and other people would use it to do amazing things that were previously unimaginable.

So today, I'm back to tell you all, in fact, there's an open data movement going on all over the world right now.

I had everyone in that auditorium

The cry of "raw data now" has been heard by people all over the world.

Take a look at the video

A classic example, the first one that a lot of people picked up on, was on March 10th, just after TED, Paul Clarke from the British government blogged, "Oh, by the way, we have raw data, bike crash data."

In just two days, Times Online turned it into a map, and they call it a mashup, and people can look at it and see if their bike route is OK.

This is traffic survey data, also published by the British government, and published in a format that follows the Linked Data standard, allowing users to create maps with just a click.

Does the data change anything?

It was 2008 in Zanesville, Ohio.

This is a map made by a lawyer showing where the houses are and which ones are connected to the water supply.

From those, he got information from another data source about which houses white people lived in.

And he found a correlation between white-occupied homes and homes with running water that seemed far from coincidental, and the judge didn't seem to be impressed by this either.

He ordered $10.9 million in damages.

This is the effect of looking at data in conjunction with other data.

Let's take a look at the British example

It's on an independent site that has government data, called Where Does My Money Go.

Anyone can drill down into the data

You can drill down on specific spending, and you can compare different regions.

This is what's happening in the UK, UK government data.

Of course we have it here in America.

Here you can see spending in California on economic recovery.

You can pick any location, say Long Beach, and see how much recovery investment is being spent on each use, like energy.

This graph shows the number of datasets in each of the US government (data.gov) and UK government (data.gov.uk) repositories.

I'm very happy that the blue England and the red America are having a good game.

How can this work?

For example, if you have enough data about an area, such as a zip code, you can even create an augmented newspaper with very local information about bus stops and neighborhoods specific to a particular area.

On a larger scale, there's a mashup of publicly available data about the Afghan presidential election.

You can set your own conditions for what you want to see

I specified that the polling place indicated by the red circle should be displayed

And then you can overlay other factors, like the risk level.

I've shown you government data.

Let's also feature community data

This is the wiki map I edited

This "terrace theater" wasn't on the map before last year's TED, so I wrote it.

I'm not the only one editing OpenStreetMap

Visualized by ITO World, the bright spots on this image represent the edits made on OpenStreetMap in 2009.

let the earth spin

Each light represents an edit. Somewhere along the line, someone looked at OpenStreetMap and realized that it could be improved.

Europe shines bright with renewal

On the other hand, some places aren't as bright as they should be.

Focus on Haiti

The map of Port-au-Prince at the end of 2009 wasn't as detailed as the map of California.

Luckily, shortly after the earthquake, a company called GeoEye released satellite imagery and licensed it for use by the open source community.

This is the passage of time in January, an earthquake occurred.

Shortly after that, people from all over the world who wanted to help gathered, looked at the satellite imagery, and quickly created a map.

This is Port-au-Prince

Blue was found by volunteers in satellite imagery in refugee camps.

So, in no time, I had a map showing where the refugee camps were located, the best map for a relief worker.

You can see it displayed on the GPS devices used by the rescue team.

And in Haiti, you can also see the hospital ship on the left hand side of the map.

Here's current information about impassable roads, damaged buildings, and refugee camps, and it illustrates what you need.

So people who are doing something in any way, people who are making charts from raw data.

I would like to take this opportunity to say thank you to everyone who puts government data and scientific data online, and we're just getting started.

(applause)

I only have 3 minutes, so I'll speak fast.

First, 27 years ago, I got a traffic ticket, and I thought,

I have thought about it several times since then.

So energy efficiency isn't just about cars, it's about roads.

The design of roads, especially intersections, is important. There are two types of intersections: those with traffic lights and those with stop signs.

50% of crashes occur at intersections

Roundabouts are pretty safe compared to this

A study of 24 intersections found that changing traffic lights to roundabouts reduced crashes by 40 percent.

Crash injuries have also decreased by 76% Fatal crashes have decreased by 90%

But this is only a matter of safety

What about time and gas?

Smoother flow means fewer brakes, which means less accelerators, less fuel consumption, less air pollution, less wasted time, which is one of the reasons why Europe's energy efficiency is better than America's.

Stop signs at unsignalized intersections have saved many lives, but there are too many stop signs.

A small roundabout is also appearing

It's the one near my house. It's a lot better than a traffic light and four stop signs.

It's expensive to install, but it's more expensive to leave the sign on. Let's see.

There are places where "stop" is not appropriate

So, for example, a T-junction

It makes sense to "stop" when entering the big one from the small road.

I have questions about the other two

This intersection too I studied this intersection

there are few cars from the third street

So the question is, what is the cost of "stopping"?

I've seen 3,000 cars in each direction pass through this intersection every day, and every time you hit the gas, it burns two ounces of gas.

5 cents each time multiplied by 3,000 every day is $51,000 a year.

It's not just the cost of gas, but also air pollution, vehicle depreciation and time.

How many dollars will an hour cost?

10 seconds each 3000 units, 8.3 hours per day

The national average hourly wage is $20, or $60,000 a year.

$112,000 with gas, that's the one-way stop cost.

That's over $2 million in present value at a 5% discount rate, which is the cost of a one-way sign.

Now, how much is the vacant lot in your neighborhood worth?

this is more profitable

So, don't you think, "Why is there such a thing?"

I mean, why are there three "stop" signs?

Because it's saving lives.

Is it not? I just want to be able to join safely from the side street.

At T-junctions, cars on the main road don't slow down, so cars that can't get off the side roads form long lines at the front.

Are existing signs okay?

"Stop" and "Yield" signs have a long history.

"Stop" signs were made in 1915 "Yield" was done in 1950

Shouldn't we use "yield"?

"Yield" signs tell you to give way to cars on the right

So if there are five cars in a row, you can't go until the sixth, all five cars, and there's no spirit of compromise.

Giving new meaning to existing signs is difficult

We can't just say, "Let's forget about giving up."

this is no good

So what we need now is a new type of sign.

(Applause) And we're going to put a sign on the bottom with instructions, because some people don't look at the Gazette.

In short, it is a fusion of "stop" and "yield"

The shape of T is T for Turns

It's unfamiliar, so it draws attention

slow down in unknown situations where you don't know how to deal with

Now, you're already a splendid "traffic scholar."

(Laughter) Don't wait for this sign because it's not going to change anytime soon.

But since you're all part of the community, you can work with the community to create caring traffic flows.

If you make these kinds of changes in your community, you'll do more to help the environment than change your car. Thank you.

(applause)

Take a look at Bangladesh

Before we get to the point, let's think together: Why is there poverty?

we have a lot of knowledge and science is advanced

Even though we live on the same planet, poverty is still rampant all over the world.

First, listen to my perspective. Let's see if the project I'm about to talk about, or any other project, is contributing to poverty eradication or alleviation.

For the past 60 years, rich countries have helped poor countries.

But overall it was a failure.

Look at this book written by someone who worked for the World Bank for 20 years and said, "I don't know why this country's economy is growing.

not the result of aid.”

why is that

I think that the history of Europe is helpful

I was walking down the street yesterday and found this exhibit across the street of three bishops who were executed 500 years ago.

So there were many struggles in Europe, and citizens empowered by technology.

Citizens wanted those in power to get off their horses and stand on the same playing field as the citizens.

In the end, better compromises were made between those in power and the people, and democracy, capitalism, etc., flourished.

What is needed for true progress, as this book describes, is that citizens take power instead of those in power.

If you look at it from this perspective, you can see that for the last 60 years, aid has been pouring in the opposite direction.

In other words, aid empowers those in power.

Those in power who ultimately left their citizens out of the picture didn't need economic growth.

We didn't have to tax people and fund the country's businesses, because the money came from abroad.

In fact, oil revenues are plentiful

The same thing is happening in countries with weaker citizens, like Nigeria and Saudi Arabia, where aid is the same as income from oil and minerals.

Empower those in power Citizens are not activated

If the labor force and talents of citizens are not utilized, then what is most necessary for the development of the country is

Economic development is about the people, by the people, for the people. People's connections drive development.

As citizens become connected, organized and more productive,

Citizens' voices are reflected in society and the world becomes a better place.On the contrary, the world's most influential institution

The World Bank is an organization of governments, by governments, for governments, just the opposite.

So that's my point of view So let's start my story

How can citizens have power?

You can use technology like cell phones

The Economist magazine recently admitted that

I came up with this idea 12 years ago, and I've been working on it ever since, 12 years ago, when I was aspiring to be an investment banker in New York.

I was connected to many of my peers through a computer network.

Efficient without changing floppy disks

We were able to exchange the latest information. One time, the network broke down.

Then I remembered the events of 1971.

At that time my country was in the midst of a war.

Our family left the city where we used to live

I had moved to a safer rural area, and one day my mother asked me to go get some medicine for my brother.

After walking 16 kilometers all morning, I arrived at the pharmacy.

I was absent, so I had no choice but to walk back for half a day.

It was a wasted day

I was in a skyscraper in New York

By comparing these two events, I realized that connection is what drives productivity, whether it's a modern office or an old farm village.

So the phone becomes a weapon against poverty.

How many phones were there at that time? When I looked into it, in Bangladesh at that time,

Only 1 in 500 people, and only in urban areas.

In a vast region inhabited by 100 million people,

I didn't have a phone.

Just like that day I wasted, if you multiply by 100 million people even if it's a waste of one month

You can see how much resources are wasted, which means that there is equality between rich and poor.

It's the length of a day, it's 24 hours, and if we lose this precious resource of time.

It's a huge loss, just like any rich country, so I started looking for some evidence.

Does Connection Really Increase Productivity? With limited evidence, I found this graph.

It was produced by the International Telegraph Union in ITU Geneva, and it shows something interesting.

Look here, the horizontal axis is the income level.

The United States and the United Kingdom are outside the chart around here.

The vertical axis is the economic effect of one phone

It's very small, while GNP per capita is

If you're a poor country with $500 or $300, you'll have a big economic impact of $5,000 to $6,000.

How much does telephone installation cost in Bangladesh? I looked it up and it was $2,000

Let's say you pay $2,000 and you can use it for 10 years.

$5,000 a year is $50,000 in 10 years.

In fact, the digital revolution is underway.

If the cost of installing a phone went down, that would be even better, although I've been dabbling in economics, too.

According to Adam Smith, Specialization Increases Productivity So how do we promote specialization?

Let's say I'm a farmer who also catches fish

My co-worker also does a lot of work

To develop specialties and interdependence

It's imperative that the two of you are connected.

But economic activity is restricted to a narrow range.

I need a river to expand

We need highways, we need phones, but anyway, connectivity makes interdependence possible.

Interdependence drives specialization

Be more productive

I started working on this issue

I went back and forth between Bangladesh and New York because there are not enough phones in Bangladesh

People said there were many reasons, one was lack of purchasing power.

Poor people certainly lack purchasing power

But if the phone is a product, don't worry.

So when you buy a car in America

Pay a small down payment, get a car and go to work

get paid by work

If you have a car, you can pay for it with your salary over time.

If the telephone is also a means of production

Don't worry about purchasing power Paying a down payment may not be easy

So I thought, maybe we can do some kind of sharing.

Everyone needs a bank in the US

Few people buy banks, which means they serve the community.

Couldn't you do the same with your phone?

Some people said that the basic needs of food, clothing and shelter came first.

It's an overprotective, meddling idea.

It is important to secure income first.

It's up to the individual to decide what they need. The real problem was the lack of infrastructure.

Deploying new things requires underlying infrastructure

The number of Internet users in the U.S. has skyrocketed

everyone has a computer

I had a modem and a phone line.

Ideas spread easily like the internet

Poor countries don't have these

For example, there was no way to do a credit check,

With few banks willing to collect, I turned to Grameen Bank for the poor.

With 1,100 branches, 12,000 staff and 2.3 million borrowers, this branch network

Considering networking with mobile base stations

I'll skip the middle, but I set out.

First, I went to Grameen Bank and said, "We can do this efficiently by connecting branches."

The organization was decentralized, perhaps out of necessity, rather than messing around with networking between branches.

They thought it was fine as it was, so they focused on how banks work.

borrow money from the bank

she buys a cow and the cow gives milk

Sell ​​the milk to the villagers and pay the bank back.

This is a typical business - how food distribution works.

I had a flash when my phone turned into a cow

So she borrows $200 from the bank.

Buy a phone, let people use that phone, and turn it into a business.

I sent a letter to the Grameen Bank and after a while I got a reply.

"It's a little crazy, but it makes sense. If it's feasible, let's commercialize it."

I quit my job and came back to Bangladesh

In Bengali it means everyone's phone

He founded a company called Gonophon, and he raised money from American investors.

i flew around the world

rejected here and there

It's the poorest people in the poorest countries, so it's no wonder they're flying around the world and losing a lot of their hair.

Finally, Grameenphone was established. The Norwegian phone company provided the know-how, and Grameen Bank provided the infrastructure needed for regional expansion.

covers most areas

Bangladesh also has depopulated areas.

But this year, we're investing about $300 million more,

And we're going to expand the service to less populated areas, like the cow model I was talking about earlier.

115,000 people bring phone service to their neighbors

We serve 52,000 villages, or 80 million people.

The revenue these phones make

It brings in $100 million to Grameenphone, and salespeople earn $2 a day, $700 a year.

the phone is perfect

improve income and welfare

Grameenphone has 3.5 million subscribers -

It's become the largest phone company, and the 115,000 phones I mentioned above are responsible for one-third of all phone calls.

We were charged a pretty hefty tax bill. We contributed $190 million to government finances.

Let's consider here

Do we need government economic improvement projects?

It's actually viable for private companies.

If the government needs to subsidize the business-

some people think

corporations help the government with taxes

Are poor people only beneficiaries?

No, poor people are a resource too.

Are Services in Poor Areas Expensive?

Involvement of the poor lowers costs

Are they helpless without an education?

They are capable, learning-minded and resilient people.

it was actually amazing

Many learned how to use the phone in one day

Do poor countries need aid?

no i need a business

Even just 5% of our economic impact has increased GNP more than the total amount of foreign aid, as I said earlier.

Aid has the bad effect of dividing the government and the people.This is a new venture with American inventor Dean Kamen.

he made a generator

Right now, we're doing an experiment in two villages in Bangladesh, using biogas-powered generators that come from cow dung. One generator sells electricity for 20 households.

this is just an experiment

I don't know yet how it will develop.

It's already working That's it Thank you

I had many encounters with fish

I really fell in love only twice

I fell madly in love with my first fish

She was amazingly beautiful, and the taste, texture, and texture were perfect.

really nice fish

(Laughter) And even better, it was a farmed fish, raised in a top-notch eco-friendly fish farm.

So no qualms

For a few months I've been obsessed with this fish

One day, the boss of the fish farm called me and asked if I could talk to him at an event about how the fish farm is eco-friendly.

"With pleasure," I replied

Finally, a sensible company has emerged that will solve a chef's biggest problem: how can we keep fish on the menu?

Over the past 50 years, humans have been ravaging the oceans, like clearing forests.

The scale of destruction is immeasurable

90% of the big fish we love are gone, tuna halibut salmon swordfish overfished

almost extinct

That's why it can't be helped. Aquaculture is the trend of the times.

Many people disagree Fish farms pollute the sea This is really inefficient Look at the tuna The biggest bad guys

The tuna feed conversion rate is 15 to 1.

15 pounds of bait fish becomes 1 pound of tuna meat

Not very environmentally friendly

it doesn't taste good

But finally there's a company that's trying to do the right thing.

I want to support this company

I called the public relations manager the day before the event.

let's keep this guy as a don

Don, I'd like to confirm, but your company farms offshore, so it doesn't pollute the ocean, right?

"That's right, it's offshore." "Excretion spreads."

And "we are not dependent on the surrounding environment"

"Feed conversion rate? 2.5 to 1."

"Number one in the industry"

2.5 to 1 or that's amazing

what 2.5 to 1 what are you using as bait

"Environmentally Friendly Protein"

I hung up the phone

I lay in bed that night and thought, what exactly is a "green protein"?

(Laughter) The next day, just before the event, I called again.

Can you give me an example of an eco-friendly protein?

Don didn't know by asking

I spoke to company representatives on the phone, but no one answered the phone, and the last person to answer the phone was the chief biologist.

Let's call this person Don too

(Laughter) Don, give me an example of a green protein.

He says algae, fishmeal and "chicken pellets."

chicken pellets?

"That's right. Feather skin." "Bone meal and scrap meat."

What percentage of chicken do you put in?

I thought maybe 2%

"30% maybe"

Don Is that environmentally friendly? Feed the chicken to the fish?

(Laughter) I was silent for a while, and then I said, "Because the world is full of chickens."

(laughs) My love has grown cold

(Laughter) It's not because I'm a self-righteous good-boy foodie.

That's true though

(Laughter) I've fallen out of love It's true After the phone call the fish tasted like chicken

(Laughter) The second fish is another love story.

It's a romantic love. The more you know someone, the more you like them.

Our first encounter was at a restaurant in Southern Spain.

A friend of mine who is a journalist is always talking about this fish.

She's the matchmaker between the two

(Laughter) The fish that was brought to the table was white and shiny.

the chef was overheating

about twice

But I was surprised.It's very delicious.

Who on earth cooks fish and overcooks it and makes it delicious?

I can't do it, but this guy can do it

Let's call him Miguel, actually, that's his real name.

(Laughter) Actually, he doesn't cook, he's not a chef, or at least not what we think he is.

In the southwestern tip of Spain - at the Veta La Palma fish farm

I'm a biologist

At the mouth of the Guadalquivir River

Until the 1980s, it was owned by an Argentinian contractor.

It used to be a cattle ranch, which was originally a swamp.

Reclaimed land

They built canals and diverted the water to the rivers

But the farm didn't work, it wasn't profitable.

Ecosystem is in a state of destruction

90% of the birds have died, 90% here is a huge number of birds.

So in 1982, an environmentalist Spanish company bought the land.

what do you think

I reversed the flow of water

I literally flipped the switch

Instead of draining it, they put the water in the canal.

flood the canal

They created a 109-square-kilometer fish farm of perch, mullet, shrimp, and eels, and in the process, Miguel and company reversed ecosystem destruction.

this fish farm is amazing

there's no precedent for something like this

When you look at the horizon, you can see far into the distance, and as far as the eye can see, the canals are flooded with water, forming a thick, rich wetland.

Recently, I was introduced to Miguel

He's a great dude, he's a mix of Darwin and Crocodile Dundee.

(Laughter) We stepped into the moor, I was panting and sweaty, muddy up to my knees, and Miguel smiled and lectured on biology.

He pointed at me and said, "It's a rare species of black kite."

Minerals required for phytoplankton

He also said that seeing the community reminded him of the giraffes of Tanzania.

I later found out that he spent most of his career in Africa's Mikumi National Park.

How, I asked, did you become a fish expert?

"Fish? I was a total amateur about fish."

"I'm an expert on relationships between living things."

And then we went on to talk about rare birds and algae and rare seaweeds.

Don't get me wrong, it was a wonderful story.

It was great, but for me

I couldn't get it out of my head I was dizzy about that fish I ate the night before

So I changed the subject and asked why is your fish so delicious?

and he pointed to the algae

I know, it's algae, it's phytoplankton, it's the chain of life, it's amazing

But what do fish eat?

What is the feed conversion rate?

"Because the ecosystem is rich," he replied.

"Aquatic plants, phytoplankton" "Zooplankton, that's what they feed on"

“Because the ecosystem is healthy” “Everything is regenerated naturally”

"I don't feed you"

Have you heard? A fish farm that doesn't feed

Late afternoon Miguel took a drive around the fish farm It's nature here It's unlike any other fish farm I've seen How in the world do you measure success?

And just then, as if the director ordered a background change

As I turned a curve, I saw an astonishing sight Thousands of pink flamingos As far as the eye could see, like a carpet

"This is it, this is success!" he cried.

"Look at that belly, it's pink."

"I'm eating a lot"

be eating? i was confused

The birds are eating your fish

(Laughs) "Exactly!"

(Laughter) "Here's fish and roe." "20% can be eaten by birds."

"Last year we were here." "There were 600,000 birds." "Over 250 species."

"It is now the largest in Europe." "The most important." "It is a privately owned bird sanctuary."

Isn't the breeding of birds the thing you hate most?

(Laughter) He shook his head and said, "No."

“We are doing extensive aquaculture here.” “It is not intensive aquaculture.”

"This is an ecological network."

"flamingos eat shrimp"

"Shrimp eats phytoplankton"

"So the pinker the belly, the healthier the ecosystem."

So here's a refresher: this fish farm doesn't feed the fish, and the fish farm measures its success by the health of the fish's predators.

A fish farm, but also a paradise for wild birds

Oh yeah those flamingos shouldn't have come here in the first place

A flamingo's nest is in a distant town, 240km away, where the soil conditions are suitable for nesting.

Every morning the flamingos fly 240 kilometers to the fish farm.

In the evening it flies 240km back to its nest

(Laughter) Flamingos fly along the white lines of the A92 highway.

(laughs) It's true.

I was imagining the movie Emperor Penguin, so I asked Miguel.

Miguel Flamingo fly 240km to come here Fly 240km back to the nest

Is it for chicks?

He looks at me like he heard Whitney Houston lyrics

(Laughter) I said, "No, it's good food."

(Laughter) I didn't mention the skin on this fish. It's delicious, but I really hate the skin.

It's bitter and tastes like tar

I never cook with the skin on

But when I ate the fish at the restaurant, it didn't look like fish skin

I thought I had put a piece of the sweet and pure ocean in my mouth

When I said that to Miguel, he nodded.

"Fish skin is a sponge"

"It's the last defense wall against foreign objects."

"It evolved to absorb impurities."

And he also said, "There's no impurities in the water here."

Review again Fish farms don't feed fish Fish farms measure their success by reproductive conditions of natural enemies

It was here that I finally realized, when I heard that the fish farm was free of impurities, I realized what he hadn't said was that the water that flows into this fish farm is from the Guadalquivir River.

Everything that rivers carry today Chemical pollutants Pesticides washed out

When that water flows through this fish farm, it's clean.

Clean the water because the ecosystem is healthy

This fish farm not only doesn't feed the fish, it doesn't just measure the success of the fish farm on the health of its predators, it's literally a water purification plant, and it's not just for the fish, it's for you and me.

'Cause the water's going into the Atlantic from here

It's just a drop in the ocean But I think it's important And so are you This love story is very romantic but also instructive

This could be the recipe for the delicious food of the future.It doesn't matter if it's sea bass or beef.

What we need now is a revolutionary way of thinking about agriculture, a way of thinking that makes food really delicious.

(Laughter) (Applause) But for most people, that's a little too radical.

We gourmets aren't realists, we're lovers

We love farm-owned markets We love family farms We love talking about local ingredients We love organic food

But when I explain that what I just said is the future of good food, someone always stands up and says, "Hey man, I like pink flamingos, too." "But can it feed the world?"

"How are you going to secure food for the world?"

straightforwardly

i hate this question

Not because we're already producing enough food for people all over the world.

1 billion people are hungry now

One billion people, since the beginning of history Hunger is actually caused by inequality in distribution, not by output.

I hate this question because it underpins food policy for the last 50 years.

"Feed grain for herbivorous livestock." "Monoculture, pesticides, fertilizers in the soil."

This is the motive, this is the reason, this is the business model of American agriculture.

What it really is is a "fire sale business" that is rapidly eroding the ecological capital on which production is based.

This isn't business, it's not agriculture

The world's food stocks are at risk not because supplies are running low, but because resources are running out.

It's not because new agricultural machines aren't being invented It's not because there's a shortage of fertile land Not a shortage of pumps and fresh water It's not a shortage of chainsaws It's not a shortage of forests It's not a shortage of fishing boats and nets It's because there are fewer fish

To secure food for the world

Let's think about securing our food first.

Let's think about how we can create conditions in which all communities can secure their own food.

(Applause) To do that, the current agricultural model is

old and outdated

We rely too much on capital, chemicals, and machines.

Follow the eco model instead

It's based on two billion years of field experience.

Learn from Miguel Learn from producers like Miguel

Let's learn from farmers who care about the environment Let's learn from farmers who stop and restore devastation. Let's learn from farmers who manage extensively.

because they care about taste

Look, honestly, they're better cooks than I am.

But I'm fine with that That's how delicious food should be in the future My cheeks drop

Thank you very much

(applause)

At this conference, many people have spoken about the power of human will.

My story, too, is a vivid picture of how the will to live can be exercised in a life-or-death situation.

I'm going to tell you about the worst disaster ever on Everest.

I was the only doctor at that time.

I'm going to tell you that story, and you'll see what's possible when people have the will to live.

Everest is pictured here

Altitude 8,848 meters

So far, four of the six trips have been with a team from National Geographic magazine measuring plate motion, and two with a team from NASA doing research on remote sensing devices.

During my fourth climb, a comet passed overhead, Comet Hyakutake.

The local Sherpa said it was an ominous omen, and maybe he should have listened to his advice.

The environment on Everest is very harsh.

The amount of oxygen at the summit is only one third of that at sea level

Temperatures near the summit can drop to minus 40 degrees

Wind speeds can range from 32 to 65 kilometers per hour.

The real problem is that the perceived temperature can drop below the temperature on Mars in the summer.

One time, near the top of the mountain, I had this experience: I reached into my down jacket and tried to pull out the water bottle I had put away, but the water was already hard and frozen.

This is an episode that tells the harsh environment near the summit.

This is the route to climb Mount Everest

The base camp at an altitude of 5300 meters is the starting point.

600 meters up there is the first camp

The second camp is 600 meters further up in the Valley of Westernkum.

The third camp is located at the foot of Mt. Lhotse.The fourth highest peak in the world is pale when seen from Everest.

Camp 4 is the highest point, 900 meters below the summit.

this is what base camp looks like

It is on a glacier at an altitude of 5300 meters

We'll unload your luggage here at the highest point you can reach by yak.

Here's my luggage, medical supplies for four yaks, thrown into the tent, so I'm sorting out my luggage.

this was our climbing team

It was the Explorers Club that hosted the National Geographic expedition.

There were three other expeditions on the mountain, the United States, New Zealand and the IMAX team.

And we spent two months setting up camp along the way.

This is the view from below the icefall The first climb from base camp is 600 meters

This is what it looks like inside an icefall, a frozen waterfall that moves very slowly and changes from day to day.

It's a place that makes you feel like a mouse in a maze. You can't see beyond the ice wall.

This is a picture of the top of the icefall

The best time to climb the icefall is at night when the ice hardens.

because the ice is less likely to collapse

Climbers reaching the top of the icefall at sunrise

This is me crossing the crevasse

Attach a safety rope and cross the aluminum ladder

this is another crevasse

Some of them are as deep as a ten-story building, and some climbers say, "The reason I climb mountains at night is because if I can clearly see the bottom of the crevasse under my feet, I will never climb."

this is the first camp

It's the first plain you encounter after reaching the top of the icefall.

And from there, climb up to the second camp on the front side of the picture.

These are the climbers climbing the slopes of Lhotse towards Camp 3.

here we are using a fixed rope

If you lose your foot here without a rope, you're going to fall 1,500 meters down.

This is a photo taken from the third camp

You can see the slope of the Lhotse ridge, about 45 degrees.

The summit of Everest is black

it's not covered in ice

Since Everest is so high and in a jet stream, the surface of the mountain is always exposed to the wind and never gets snow.

What looks like clouds behind the ridgeline to the summit is actually snow blown off the summit.

This is going through the clouds from Camp 3 to Camp 4.

and this is the fourth camp

Once you get to Camp 4, you have at most 24 hours to decide if you're going to the summit.

We're all on oxygen. We have limited supplies. Go up or go down.

This is a picture of Rob Hall

was the leader of the New Zealand team

It's the radio that he used to talk to his wife, and I'll talk about that later.

Climbers waiting to attack

They're in Camp 4. You can see the wind blowing from the top.

Climbers are waiting for the wind to subside as the weather is unsuitable for attacks.

The wind actually subsides at night

It becomes very calm and there is no wind at all.

looks like a chance to attack

Climbers reach the summit from what is called the Triangular Face.

First stage of attack

It's not as steep as the next stage, so we'll pass it at night to make sure we have time for daylight.

This happened

Climbers perched on the southwest ridge

This is the southwestern ridge

the top is in front

From here you climb 450 meters with a 30-degree incline to the summit.

But this year the wind suddenly became unexpectedly strong.

A storm no one expected

What you see in this picture is a tremendous wind blowing the snow off the top.

Climbers were on this ridge

This is a picture of me taken a year earlier in the same area, and you can see I'm wearing an oxygen mask with a rebreather.

I am connecting the oxygen hose from here

This is how you carry two oxygen tanks on your back -- small, lightweight titanium tanks -- and carry very little else.

That's it. We're defenseless on the summit ridge.

This photo was taken from the summit ridge

This is the ridgeline that climbs 450 meters to the top.

We don't use ropes here, because on either side of the ridge, it's a steep slope, so if you're connected to someone, you're just dragging them down.

Everyone falls apart and climbs

The path is not straight, the climb is very difficult, and there is always the danger of falling left or right.

If you fall on the left side, you will fall 2,500 meters on the Nepalese side. If you fall on the right side, you will fall 3,500 meters on the Tibetan side.

Falling on the Tibetan side might be better because you'll live longer.

(Laughter) Whichever way you fall, the rest of your life will just fall.

Up here, on the ridgeline near the summit, there were some climbers, and I was waiting at camp number three.

While they struggled with the storm on the mountain, I was struggling in camp three.

The storm was so strong that I was lying on the floor of my tent, fully clothed and equipped, trying to keep the tent from blowing away.

It was the worst wind I've ever seen

What's more, the climbers on the ridge were 2,000 feet higher, facing the wind directly.

Some had radio

A photo of the view along the ridgeline

During the storm, we radioed in to see Rob Hall here with Doug Hansen.

Rob is safe, but Doug says he's too weak to go down the mountain.

Rob was accompanying Doug when he was exhausted.

There was bad news out of the storm that another mountaineer named Beck Weathers had also fallen dead in the snow.

There were 18 other climbers whose whereabouts were unknown and missing.

The top of the mountain was in chaos. Even if information came in, it was chaotic and full of contradictions.

I have no idea what's going on in the storm

We were just sitting in our tents at camp number three.

Todd Burlson and Pete Assance, the most stalwart members of the group, decided to climb the mountain to rescue as many of their friends as possible, of course, in a violent storm.

They tried to get in touch with Rob Hall over the radio, and there was an outstanding climber stranded near the summit with a lesser climber.

I thought they wanted Rob to say, "Wait, I'm going now."

They said, "Leave Doug and go down alone.

There's no chance he'll survive, so at least he'll survive on his own."

Rob got a message, and the answer was, "Doug listens too."

Todd and Pete to reach this summit ridge and get everyone back on their feet in the chaos

I did what I could

I radioed advice from Camp 3 and urged climbers who were able to get down on their own to go down the mountain.

Those immobile were left in the Fourth Camp.

Climbers descended along this route

This is a photo taken from Camp 3 where I was.

I met with them all and examined them, but nothing much could be done, because Camp 3 is just a small notch in the middle of a 45-degree ice wall.

Only space to stand outside the tent

It's extremely cold at 7,300 meters above sea level.

At this altitude, all I had was two plastic bags of painkiller injections and steroids.

Every time climbers came, I checked if they were ready to go further down.

For those who were unconscious and confused, I injected them with steroids so that they could, even temporarily, think and move clearly down the mountain.

It's difficult to treat on top of the mountain, so sometimes I had to inject through my clothes.

Other detailed operations were difficult and there was no other choice.

I heard about Rob Hall while treating them.

there is no way to help him

I was informed that I was already going solo.

Doug seemed to have died higher up

Rob was too weak to go down the mountain on his own, and there was no one to help him reach that altitude in the high winds.

That's when he asked to speak to his wife.

because he had a radio

His wife at home in New Zealand was seven months pregnant with their first child.

We decided on names for our two babies.

And Rob cut off the radio, and that was the last call.

At 7,300 meters above sea level, it's impossible to treat so many critically ill patients.

So we lowered the victims to a manageable altitude of 6,100 meters.

This was our medical kit

A first aid kit full of equipment

I took it up the mountain

The first camp had more materials, and they delivered it to me.

This is what the first camp looks like

Survivors keep coming in

Some victims were both hypothermic and frostbitten.

Our procedure was to warm the body as much as possible and resuscitate it with oxygen, which was also a difficult task in the frozen tent at 6,100 meters.

Here's a picture of frostbite on the legs. It's frostbite on the nose.

This climber was snowblind

During their treatment, something unbelievable happened.

Beck Weathers, whom I had heard dead, appeared out of nowhere and stumbled into the tent, looking like a mummy.

Just when you think it's incoherent, he walks into the tent and says, "Hey Ken, where should I sit?"

Then he asked me, "Can I use my insurance?"

(Laughter) I really did.

(Laughter) I was sane, but I had severe frostbite.

As you can see, his hands were white and the frostbite on his hands and nose was terrible.

Frostbite first turns white, then completely necrotizes, turns black and then falls off.

This is the final stage, like a scar.

When I was treating Beck, he told me what happened on the mountain.

He was lost in the storm, fell in the snow and lay there motionless.

I heard other climbers stop by and look at him and say, "He's dead."

But Beck was alive, and he could hear it, but he just couldn't move.

I was in a kind of catatonia, able to see what was going on around me, but I couldn't even blink a blink of an eye to show that I was alive.

Climbers passed by, and Beck lay there for a day, a night, and another day in the snow.

Then he mutters to himself "I don't want to die

family is waiting

Thinking about my family, thinking about my kids and my wife gave me enough energy to motivate myself and get me on my feet.

After lying in the snow for such a long time, I got up and made my way back to camp.

Beck told me this quietly, and I was completely overwhelmed.

It was absolutely unbelievable that someone who had been lying in the snow for such a long time could get up.

It's like you've recovered from an irreversible hypothermia.

I can only guess how they did it.

If Beck was in a device that measures brain function, like a SPECT scanner, what would he be able to observe?

Briefly, the brain is made up of three parts: the frontal lobe, which is responsible for attention and concentration; the temporal lobe, which is responsible for drawing and remembering things in the mind;

Now let's put Beck in the SPECT machine and take a cross-section of his brain.

This device measures dynamic blood flow, the flow of energy in the brain.

The prefrontal cortex that glows and looks red here.

blood flow is fairly evenly distributed

The central part, which you can see here, is where the temporal lobes are usually located, and the posterior part is where the life support functions are located.

This brain is mostly normal, evenly distributed energy.

Here, the frontal lobes are shining brightly.

This may have been what Beck was in when he realized he was in danger.

All my attention is focused on getting out of the crisis.

this part of the brain is quiet

I don't think about my family or anyone else, and I work really hard.

I'm activating my muscles and trying to get out of this situation.

But this is where things start to get worse.

I'm running out of energy

It's too cold to sustain the metabolism in your body.As you can see, there are no more red spots.Your brain is quiet.

He collapses into the snow, his brain is quiet, the red part is almost gone.

Beck is losing vitality

dying

If you look at the next scan, in Beck's case, the center of the brain starts to light up again.

he's starting to think about his family

Create an image in your mind that motivates you to get up

With his thoughts, he creates energy in this realm.

And this is how he connects thought to action.

This is called the anterior cingulate gyrus of the brain

Many neuroscientists believe that this may be the root of human will.

It's the part where you make decisions and exercise your willpower.

As you can see, the energy coming from the center of the brain is sent to this area of ​​the image of the family, where he focuses his will.

This becomes more and more intense, and gradually becomes a driving force for him.

I've gotten to the point where I create enough energy for a day, one night, another day, to wake myself up.

And as you can see here, it's concentrating more energy in the frontal lobe.

I started concentrating and I was able to think.

thinking about what to do to help

So this energy is being sent to the front of the brain, and it's quieting down here, and he's using this energy to figure out what to do to get him going.

And that energy is spreading to the thinking part of the brain.

Don't think about your family and focus your energy

It's here, in the back (frontal lobe), that directs the movement of the muscles that start moving the body.

Heart and lungs start to work faster

This is what I imagined would have happened if Beck had been put through a SPECT scanner while he was fighting for his life.

The allowance I could make for the 6100 meters seemed so trivial compared to what he could have done on his own.

It tells the great power of human will.

He was in critical condition, there were many critically ill patients, and fortunately we were able to call in a helicopter to rescue them.

Helicopters came up to an altitude of 6,100 meters to perform the highest rescue ever.

We were able to land on the ice, carry Beck and the other survivors out one by one, and get them to a clinic in Kathmandu before we even reached base camp.

Here's a picture of the expedition at base camp, which lost some climbers.

A few days later, we also held a memorial service here.

Sherpas light juniper branches

I believe juniper smoke is sacred

Climbers stand around a large boulder and talk about climbers who died near the summit, and they actually went up to the mountain and talked to them directly.

Five climbers died

This is Scott Fisher Rob Hall Andy Harris Doug Hansen and Yasuko Namba

And there's another Beck Weathers who could have died that day, but survived.

Because of his tremendous willpower, he was able to use all of his powers of thought to pull himself out of this crisis and survive.

This is a Tibetan prayer flag

Sherpas believe that if you write a prayer on this flag, your wish will reach the gods.This year, Beck's wish came true.

Thank you very much

(applause)

I've been fascinated by the psychological effects of placebos, and it might seem strange that I, as a magician, would be interested in such a thing if I didn't take into account the common denominator that what is believed to be fake becomes real if you believe it.

This is the so-called placebo effect, where a sugar pill works quite well in some studies, simply because the person believes that the drug or something is working. Take the pain-relieving effect, for example, when the patient believes it's working well enough, what's called the placebo effect occurs in the body.

It's the person's perception that makes the fake the real.

I want to show you some basic, very simple magic to help you understand.

This is a trick that has been in every children's magic book since the 1950s.

I learned this myself in the 1970s in Boy Scouts.

I'll show you first, then I'll reveal the truth

And I'll explain why I uncovered

let's see what happens

The knife and my hand, you can check it out.

I simply hold my knife like this

Don't let anything come in or out of your sleeve

Shall we roll up our sleeves? I'll hold your wrists here.

Nothing can come and go as you can see Nothing can come and go from the sleeve

seeds are so simple

Open your hand, and if successful, your body's natural magnetism should hold the knife in place.

In fact, it's held in place so firmly that even if you shake it like this, it won't come off.

Nothing is sticking out of the sleeves No tricks It's okay if you check everything

Jahn!

(Applause) This is a trick I often teach to young children who are interested in magic, because it's a very simple method, but it teaches them the great effect of deception.

I'm sure many of you in the audience know this trick.

Seeds are like this

hold a knife in hand

I told you I'd hold your wrist here so you can't cheat something from your sleeve, but that was a lie.

Holding your wrist is actually the seed of this magic.

The moment my hand turns away from you, my index finger here moves to a position where it points like this from this place.

pretty good

It sounds like you didn't play magic as a kid.

(Laughter) So hold your arms like this

Try moving your finger while reversing the direction

Think about why you were fooled by not realizing that there were three fingers peeking out from below, because in your mind you don't count fingers as one, two, three, but as groups.

But that's not all, is it? then open your hand

Of course, the knife isn't attached magnetically, but is held down from behind by a phony index finger.

The next time you close your fingers, it's the same thing.

Then let go, then take the knife

Now you can do magic in front of your friends and neighbors.

(Laughter) What does this have to do with the placebo effect?

I read a research report about a year ago that was really shocking.

I'm not a doctor or a researcher, so this really surprised me.

When you give a placebo like aspirin in the form of a white pill, it's really just a white round pill, but it makes a visible effect.

But if you change the shape of the placebo, say, make it smaller, make it blue, and print the text, it actually has a greater effect.

Both, of course, are just sugar pills and don't contain any pharmaceutical ingredients.

But white pills aren't as effective as blue pills.

What was that? (Laughter) I was really surprised.

But it's not over yet

If you administer a capsule, they say it's more effective than any pill.

Colored capsules, one yellow and the other red, which are more effective than white capsules.

The dosage seems to have an effect as well.

2 pills a day won't do as well as 3 pills a day...sorry i don't remember the stats very well

But the point is... (laughs)

...doesn't matter how much you take.

And the shape also seems to have some effect.

If you want the best placebo effect, needles are the way to go.

You put a few milliliters of any kind of liquid in a syringe that doesn't do anything, and you shoot it into the patient... in the patient's head.

Injections are perceived to be so effective that they produce tremendous results when compared to white pills.

I'll show you the charts sometime when I can show the slides.

The point is that blue pills are stronger than white pills, capsules are stronger than tablets, injections are stronger than capsules.

And none of them actually contain drugs or anything, it's just the perception of the patient that turns the fake into the real thing to create the effect.

I thought I could apply this to my magic.

So let's make this obviously fake trick real.

This research shows that when you're looking for realism, you end up with needles.

This needle is 18 cm. It's very sharp. Let's sterilize it a bit first.

This is my real hand, it's not fake

This is my body, not a Hollywood special effect.

Pierce the skin and push the needle through to the other side.

It makes me nauseous -- (Laughter) The ones who faint easily -- the eyes -- I actually did this last night in a hotel room in front of some friends and strangers, and one woman nearly passed out.

So if you're feeling sick, just look away for the next 30 seconds -- and cover up the first scary part.

I can see it, but if you don't like it, please look away

So let's get started, let's start right here under the arm and let it penetrate from here.

I'm sorry.Are you scaring me?

So let's break a little bit under the skin and let it go all the way through to the other side.

So basically what we're doing is the same knife trick I mentioned earlier.

(Laughter) In a way.

But now you can't count your fingers, can you?

Let's take a look 1 2 3 4 5

I agree...

I know what you're thinking

"I wouldn't stab myself in the arm for a few minutes of entertainment," he said.

let's just take a look

what does it look like? it worked

(Laughs) I know.

Those of you in the relay room will be closer to the screen.

let's take a closer look

This is really my arm, not Hollywood special effects

It's your arm, so you can twist it.

Excuse me, if you start to feel sick, please don't look away

I'm sure people in the background, and people who see this later in the video, are saying, "Yeah, it looks pretty good, but if it's really going through your arm, you're going to bleed." There's a hole here and there.

Let's bleed a little

(Laughter) Here it comes out

(Applause) (Laughter)

Normally, I'd take the needle out here, wipe my arm, and show you that there's no hole.

In this situation, let's keep it with the idea of ​​turning something false into something real, and walk off the stage.

(laughs) I can meet you all tomorrow and the day after tomorrow.

I hope you can look forward to it Thank you

(Laughter) (Applause)

Today I'm going to talk about research into suspended animation.

When I bring up the subject of suspended animation, most people give me a Balkan greeting and laugh.

I'm not talking today about giving people a lot of tranquilizers and sending them to Mars or Pandora, although that might be interesting too.

What I'm talking about is the idea of ​​using suspended animation to save people who have been traumatized.

So when you say "suspended death," what do you mean?

It's the process by which an animal can become lifeless, appear dead, and then come back to life without any hindrance.

Now here's a rather surprising observation: if you look at nature, you'll find that where there's suspended animation, there tends to be permanence of life.

So what I'm going to talk about is finding ways to bring patients a little closer to asphyxia, so that heart attack patients don't die so easily.

Plant seeds and bacterial spores are just one or two examples of extremely persistent organisms.

These creatures represent some of the most persistent forms of life on Earth, and they tend to spend most of their time in suspended animation.

Scientists say that bacterial spores exist as individual cells and can exist for 250 million years in suspended animation.

To give you an idea of ​​what these tiny creatures are, let me give you a familiar example.

It's an egg from an immortal embryonic cell in the human ovary, and the egg actually resides in the ovary in suspended animation for up to 50 years or so of a woman's lifetime.

And for my favorite example of suspended animation,

I have a sea monkey

I think people with children know

Available at pet stores and toy stores

If you open the bag and put the contents in a plastic tank, within a week or so, you can see the shrimp swimming around.

I had no interest in swimming.

I was intrigued by what was going on inside the bag, the bag you see in the toy store, and the shrimp in it, in suspended animation, sleeping semi-permanently.

Now, suspended animation isn't just found in cells and weird little organisms.

On rare occasions, humans can appear to be dead for a short period of time.

10 years ago there was a skier in Norway who fell into a frozen waterfall and spent two hours in the water before being rescued.

I was so cold, I had no pulse, I was practically frozen to death.

Seven hours later, she still had no pulse, but she came back to life and later became the chief radiologist at the hospital that saved her.

Two or three years later -- this kind of story excites me -- about two or three years later, in Canada, a 13-month-old baby.

When my father went out on the night shift in the winter, I went out with him wearing only diapers and froze to death.

It was found hours later, but the baby came back to life.

A 65-year-old woman was found frozen to death in her front yard in Duluth, Minnesota one winter morning last year.

I'm fine, so when I try to check

I got upset and went home

(laughs) It's a miracle, right?

These are the miracles that really happened

Doctors often say, "If you're not warm and dead, you're not dead."

you're really right

A study published in the New England Journal of Medicine found that with proper rewarming, a person who had no heartbeat for three hours could be brought back to life without neuropathy.

More than 50% chance

So what I was trying to do was somehow study suspended animation and see how I could recreate what happened to the skier.

It's very strange, but even if you're in a hypoxic environment, you don't always die.

The oxygen level in this room is about 20 percent, and if we lower that level, we're all going to die.

In fact, even small earthworms, nematodes, and other organisms used in our lab died when placed in a hypoxic environment.

But I think you'll be surprised

If you lower the oxygen concentration even further, to 10 parts per million, which is 100 times lower, the worms and nematodes will not die, they will go into suspended animation, and they will be able to come back to life without any hindrance.

This oxygen concentration, exactly 10 ppm that caused asphyxia, is constant.

found in a variety of organisms

one of them is a fish

Like an electric switch, you can turn your heartbeat on and off, putting you in suspended animation.

I was very surprised that you could do this.

So when I was trying to recreate the skier's condition, of course, I realized that she wasn't consuming oxygen, so maybe she was in near suspended animation.

But considering that it was getting cold

I wondered what would happen if we chilled the suspended organisms in the lab.

And what we've found is that when you and I cool living organisms, we use earthworms -- they die.

If you put it in suspended animation and then cool it down, it won't die.

And this is a very important point: if you want to survive in the cold, you have to go into suspended animation.

this is a great find

So I was thinking about these connections and whether this is actually what happened to skiers.

"Is it possible that humans have produced some kind of agent in their bodies that could modulate their metabolic adaptations to survive the extreme cold and die?"

It might be interesting to try to find something like that.

thought

Now, let me just say that the physiology textbooks you see say that this is a heretical idea.

From the time you take your first breath to the time you take your last breath -- from the time you're born to the time you die -- you can't drop your metabolic rate below what we call your basal metabolic rate.

But I knew there were examples of animals, including mammals, that slowed down their metabolic rate, like ground squirrels and bears, which slowed down their metabolic rate when they hibernated.

So I thought, "Can we find some kind of agent that induces this state?"

and started looking for something like that

This time was not good at all

I'm not talking about Ken Robinson's failing glory, but he was failing.

I'm not talking about Ken Robinson's failing glory, but he was failing.

I've tried a lot of chemicals and agents, and none of them worked.

One day, I was at home watching TV, my wife was putting the kids to bed, and I was watching TV.

PBS's educational program NOVA just so happened to be featuring caves in New Mexico.

They were showing Lechuguia cave, this cave is very toxic to humans without full equipment.

Researchers can't even enter

It's full of hydrogen sulfide, a poisonous gas.

Now, interestingly enough, this hydrogen sulfide is in the human body.

self-generated

The highest concentration is in the brain

But in World War I, it was used as a chemical weapon.

very toxic substance

In fact, it's been known that if you inhale a certain amount of hydrogen sulfide in a chemical accident, you'll collapse, and you'll appear to be dead, but if you're quickly brought out into the atmosphere, you can come back to life without a hitch.

I thought I had to get it

(Laughter) But this is post-9/11 America.

Can I have some canisters of lethal gas in a highly concentrated canister of compressed gas?

There is no problem at all."

It was hard to say, but I explained that there was really a reason to try.

This substance is in the human body, and in fact, interestingly enough, it binds in cells, exactly where oxygen binds and burns, and this burning is what we do to live.

So I wondered if it's possible to give people hydrogen sulfide, like in the game of musical chairs, and then take a position, like in the game of musical chairs, where the oxygen binds.

Then the oxygen can't bind, so it won't be consumed, and you may need less oxygen.

Is it possible?

So -- (Laughter) I have a little bit of dopamine anxiety, a little bit of delusional anxiety, but that's about it.

So I wanted to see if I could use hydrogen sulfide at low temperatures to mimic the skier's situation in mammals.

Mammals are warm-blooded animals, so they shiver when it gets cold, right?

It's actually burning extra oxygen to try and keep your core body temperature at 37 degrees.

So the results of administering hydrogen sulfide to mice at low temperatures were interesting, because they lowered their core body temperature.

get stuck

looked dead

Oxygen consumption rate is 10 times lower

and this is a very important point

I told you that there is hydrogen sulfide in the human body.

It's rapidly metabolized, and after six hours of suspended animation, all we had to do was put the mice in room temperature.

this was a huge success

It's true, because we found a way to put mammals in suspended animation, and mice didn't suffer.

So we found a way to reduce oxygen consumption to a minimum, and we were fine.

In this state of asphyxia, the mice were paralyzed, but they didn't die, they didn't suffer any aftereffects.

So I thought, "Is this the agent that was in the skier's body? Could it be that there was more of it than the others, so that it could lower its oxygen requirements before it got colder and not die like it did with the worms?"

And I thought, "What can we do with the ability to control this metabolic flexibility?"

And one of the things that struck me was, I think some of you are economists, but we all know supply and demand.

If the supply equals the demand, all is well.

So this ability to control can reduce demand.

We should be able to bring supplies down to unprecedented lows without killing animals.

And with funding from the Defense Advanced Research Projects Agency, we were able to prove it.

If you give mice hydrogen sulfide, you can lower their oxygen requirements, and you can put them in conditions with reduced oxygen levels up to 1,500 meters above the summit of Mount Everest, and you can leave them there for hours without any problem.

this was really awesome

They also discovered that if given hydrogen sulfide, animals could survive fatal blood loss.

From these proof-of-concept experiments, I thought we should start a company and apply this to a wider range of fields.

I founded a company called Ikaria with the help of people.

And the first thing this company did was manufacture a liquid formulation of hydrogen sulfide in an injectable form and distribute it to doctors and scientists around the world working on a model of critical care, and the results were very positive.

In one model of heart attack, animals given hydrogen sulfide had 70 percent less heart damage than animals receiving standard care, which is what heart attack patients currently receive.

The same is true for organ failure when kidneys or livers are poorly perfused, when acute respiratory distress syndrome is present, or when there is reduced function due to damage sustained during heart bypass surgery.

So, trauma medicine thought leaders around the world say it's true that the damage caused by lethal hypoxia can be reduced by administering hydrogen sulfide.

I would also like to point out that the concentration of hydrogen sulfide required to achieve this effect is very low.

In fact, doctors don't have to slow their patients' metabolism down too much to get the benefits I mentioned, which is good news for prospective adopters.

Putting people in a coma to save someone is a complicated story.

(Laughter) So that's why we're doing a human clinical trial right now.

So now -- (Applause) Thank you very much, although the Phase 1 safety trial is going well and we're moving on to the next phase.

Phases 2 and 3 are likely to take several more years.

It's all happening very quickly. The mouse hibernation experiment was done in 2005, the first human experiment was in 2008, and we'll know in a few years if this works.

Everything went really quickly thanks to the help of many people.

First of all, my wife. I couldn't do this talk or my research without her. Thank you very much.

The brilliant scientists and other people who work in my lab are also at this wonderful laboratory in Seattle, the Fred Hutchinson Cancer Research Center.

And thank you to all the amazing scientists and operations people at Ikaria.

One of their achievements is that they combined the hydrogen sulfide technology of a start-up that was consuming tremendous venture capital with the technology of a company that sells another toxic gas, which is even more toxic than hydrogen sulfide, and is given to newborns who are about to die because they can't oxygenate their tissues properly.

This gas, which has been distributed to more than 1,000 critical care hospitals around the world, is currently licensed for limited use and has saved thousands of life-threatening babies.

(Applause) It's really great to be involved in something like this.

And I think we're moving toward a fundamental understanding of metabolic flexibility, and in the not-too-distant future, paramedics may be injecting hydrogen sulfide and related compounds into seriously injured people, who may be able to move closer to asphyxia and save their lives.

By slowing down your metabolism, like dimming the lights in your home,

It can buy you time to get to the hospital and get the treatment you need.

And after treatment, you wake up like a skier, a lab mouse, a 65-year-old woman.

Is it a miracle?

I hope it becomes a reality, or at least a common miracle.

thank you very much

(applause)

When it comes to phones, Intel has tested a lot of what I'm going to show you today in about 600 senior homes over the last decade -- 300 in Ireland, 300 in Portland -- and we've been working on the question of how to measure and monitor people's behavior in the most medically meaningful way.

Think about the phone.

By testing simple sensor network technology like this in the home, we hope that the phones that older people are already familiar with will help them take their medicine.

When seniors pick up the phone, they hear a message telling them what medicine they should take, and they can simply pretend to be having a conversation with a friend.

You don't have to be ashamed of the old, frail medicine cup on your kitchen table.

This covert technology can help you do something as simple as remembering to take your medicine and taking it correctly.

We also do other amazing things on the phone.

In fact, every time you get a phone call, you're taking a perceptual test.

Think about it, I will show you how to receive 3 patterns of phone calls

"Hello oh"

ok this is the first one

“Hello, um, ah.”

"Hello, um, who?

ah"

What do you think?

We're going to take a long-term look at how older people answer and answer the phone, and we'll look at the moment of recognition with precision to the nearest 0.1 microsecond.

This time-to-recognition may be the most clinically relevant early measure for detecting the onset of dementia.

These are called behavioral indicators.

And there are other things, like, when the phone rings, does it take longer than it used to to answer?

Am I deaf or am I crippled

I've done research in people with Alzheimer's disease and especially Parkinson's disease, whether their voices are smaller than they used to be, and I've found that sometimes the hoarse voices heard in people with Parkinson's disease may be the earliest indicator, five to 10 years before the disease becomes clinically apparent.

However, since it is difficult to notice such a subtle change in voice, patients themselves and their spouses do not notice it until the voice becomes extremely low.

The phone's sensors are paying attention to such voices.

How much is your hand shaking when you pick up the phone and how does the shaking change over time?

Are you having a harder time pressing buttons than before?

Is it clumsiness or is it the onset of arthritis?

Are you calling more often or are you less social than you used to be?

We look at trends: Is decreased sociability an indicator of future physical health?

What a revolutionary idea, outside of the United States, we might be able to use this completely new technology to talk to a nurse or a doctor on the other end of the phone.

How wonderful it would be if one day we could actually do this.

I call these behavioral indicators.

This is exactly the area that we've been trying to research at Intel for the last 10 years.

How to use simple disruptive technology and what are the five slogans I'm going to talk to you about today.

Behavioral metrics matter

how to change behavior

How can we measure behavioral changes to effectively prevent disease and track disease onset and progression over time?

Now, why has Intel spent so much time and money over the last 10 years researching the needs of older adults and these behavioral indicators?

This is an example of a field study we did.

I've lived in 1,000 elderly homes in 20 countries over the last 10 years.

I surveyed people in Rochester, New York.

We decided to live there in the winter, because winter life, access to medical care, and their sociability are very different from summer.

If you break your femur, you go to the hospital with them and research your entire experience up until you leave the hospital.

If you have important family members who contribute significantly to caregiving, including that family member

So it's a study of the whole medical experience, and we've studied over 1,000 older people in 20 countries over the last 10 years.

Why Intel is willing to invest in this research

The reason is in the second slogan

Ten years ago, when I started asking Intel for permission to research disruptive technologies to support independent living, I called the challenge "Y2K + 10."

When you think back to the year 2000, people were constantly worried about the aging of their computers, and they were so focused on whether they could survive the transition from 1999 to 2000 that they missed the moment when only demographers were paying attention.

It's right around New Year's

There was a sudden sea change, for the first time, the number of older people in the world exceeded the number of young people.

For the first time in history, demographers expect this to continue, barring an alien invasion or a global epidemic.

It was 10 years ago, so you'd think you'd have plenty of time to convince Intel.

The Y2K+10 problem is getting worse and the baby boomers are starting to retire.

So folks, here's a familiar demographic.

this is a map of the whole world

It's like the lights are on but nobody's there. It's just a Y2K + 10 problem.

Everyone knows it, but they don't realize it, and nobody really wants to tackle this problem.

Health care reform bills largely ignore the reality of aging, and we can also surmise that we need to change not only how we pay for care, but also innovative ways of delivering care.

this problem is up to us

You've probably seen this headline: Catherine Casey, the first Baby Boomer to receive Social Security.

This year she chose to retire early.

She was born a second after 1946.

I was a teacher before I retired, and I'm with an insurance administrator.

First Baby Boomers Didn't Wait Until Next Year, 2011

Already this year, some people are retiring early.

Now, the Y2K+10 problem is already here.

You could say that 50 tsunamis are reserved, but we don't seem to be able to deal with them with governments and advanced technology. Are we waiting until disaster strikes instead of preparing now?

One of the reasons it's so hard to prepare for this Y2K+10 problem is that we're addicted to mainframes.

Six or seven years ago, Andy Grove used the term "mainframe medicine," in Fortune magazine, although he probably forgot about it, and I've been developing this idea.

He said, "Eric, that's a clever idea."

I said, 'What you put in Fortune magazine

I just developed it."

this is the mainframe

This idea of ​​spending money on medical institutions to go and share them together started in 1787.

This is the first general hospital in Vienna.

Vienna's second general hospital was built around 1850, and it developed a thorough medical curriculum and began teaching specialized subjects to medical students.

It also gave rise to the very idea of ​​dividing the human body and the structure of medical care into separate departments and compartments that were developed here.

Our healthcare structure followed suit, and medical education was influenced by it, and this mainframe thinking continues to this day.

Now, I'm not anti-hospital.

I have taken medication for my illness and have been to various hospitals.

But we tend to think high-rise hospitals are amazing.

Yes, this is mainframe medicine.

And just 30 years ago, the technology we're using today was unthinkable. Mainframe computers that used to be the size of our room are now in our bags and in our cell phones on our belts.

We have to move from mainframe-minded medicine to person-centered medicine.

we're too obsessed with this way of thinking

When Intel asked people around the world, "What is the first thing that comes to your mind when you hear the word medical?"

Generally the first answer is "doctor"

The second answer is "hospital" and the third is "disease"

Our imaginations are stereotyped that this is what happens when you talk about health care and health care reform.

When you ask healthcare policy makers about the ongoing debate about healthcare reform and healthcare IT technology, it's all about how to get doctors to use electronic medical histories on mainframes.

I have no idea how to move from the mainframe to the home.

The root of this problem lies in our medical perception.

Our current system is reactive and crisis-responsive.

Treatment time is 15 minutes

Medical care is taken at the level of the entire population

In this artificial environment, we collect biometric information, then we quickly cure patients and send them home, handing them brochures and pointing them to sites on the Internet, hoping they will follow instructions and not return to the mainframe (medical facility).

Ladies and gentlemen, you can't do it this way anymore

Mainframe medicine cannot treat the uninsured.

Still, we're trying to handle the multifold aging wave.

The old medical system is bankrupt. Something new is needed.

attention must be paid to the home

We need to focus on personalized health care that moves health care into the home.

How to continuously measure biometric information

How to obtain patient-specific normative values

How can we gather information about behavior, psychology, and relationships in and around the home?

How does it become a personalized, custom treatment plan that uses amazing technology to change our behavior by enforcing treatment instructions?

This is what we need for the personalized healthcare model.

To give you a few examples, Mimi, the only participant in our study, when she was in her 90s, worried about her falling, her family decided to put her in an institution.

Raise your hand if you've had a bad fall or if a parent or family member has had a bad fall

It's a typical pattern: older people are often institutionalized after a hip fracture.

So was Mimi's case, when her worried family decided to move her out of their home and into a nursing home.

So she tripped over the oxygen respirator.

People in this age group have a nurse call, but they don't want to be taken care of, so they don't use it, even though they pay $30 a month.

baby boomers will definitely push

You'll press the nurse call without rest

Mimi broke her pelvis and lay there all night and the next morning waiting for someone to find her and take her to the hospital.

I was treated there, but I couldn't go back to a nursing home, so I was placed in a geriatric ward.

On her first night in the same facility's geriatric ward, she was moved to a different bed, where she broke her pelvis again and was sent back to the hospital, where no one looked at her charts and put her on Tylenol, to which she was allergic.

Now, the scariest thing about this story is that this happened to my grandmother in the house.

I'm Eric Dishman, I speak English, I'm an Intel employee, I'm well paid, and I have a good understanding of my research area of ​​falls and related injuries.

I get to meet senators and CEOs.

But it still doesn't prevent things like this from happening.

What if you don't have the money and you don't speak English when these inevitable problems arise?

In the first place, what measures should be taken to prevent the majority of falls?

Let me give you an example of the research we're doing to do just that.

I've been wearing a little electronic device called a shimmer.

Here is a research platform

This machine has an accelerometer and can also have an electrocardiograph.

It can wear a variety of functions, and these will record your actual tremors, gait, stride length, etc., in the outside world.

As you can see from Mimi's example, the problem is our knowledge of falls, which is about as little as the "What were you doing at the time of your fall?"

That's the "cutting edge"

But we're starting to deploy machines called Shimmers and Magic Carpets -- sensors in the carpet and cameras used in sports medicine -- in 600 senior homes, and by collecting data on their actual movements, we're beginning to understand the subtle shifts in movement that can signal that a mother is at risk of falling.

And in many cases, two types of intervention are possible: treatment of fractures and adjustment of prescriptions.

I'm working with qualitative data, but if you look at the data coming from home, you can estimate the date that some doctor prescribed a new drug without knowing it, because there's a clear change in movement patterns within the home.

Discovering these behavioral indicators and changes in behavior is like discovering microscopy that has very important implications for medicine, made possible by the first attempt at collecting data streams.

This is the Trill Clinic in Ireland, as you can see here, she's looking at data from the Magic Carpet.

This little carpet allows us to monitor postural swings and changes over the course of many months.

Here is an example of such data

This is where the sensor is reacting

This participated in our research

It's about a year's worth of data for two elderly people.

The rooms they moved to are shown in different colors.

The person on the left is living at home.

The person on the right lived in a nursing home.

And you know how, because meal times, when you're not in your private room, are very regular.

It may not seem like a big deal, but

By looking at this kind of data collected repeatedly over a long period of time and looking at behavior completely, from room-to-room movement in the home to microscopic foot movements like those captured by shimmers, this data stream reveals a lot about behavioral patterns that we didn't know before.

Look at the ORCATech.org site, which has nothing to do with orcas, the Oregon Medical Center for Aging, and there's a lot more information there.

Intel is still one of the world's leading independent living technology research sponsors.

The problem isn't that we boast a lot of funding, but that other people don't care about aging, and that funding for research into new coping strategies, chronic disease management, and independent living at home is extremely low.

My fourth slogan is failure unless it spreads to 10,000 households.

Internationally, if that's not possible, then at least on a national scale, we need to do research similar to the Framingham heart study in assisted living technologies, by providing 10,000 high-speed, high-speed, elderly homes with a solid base to start medical analysis and research, and by developing a university-sponsored case study of 20 homes into a large-scale clinical trial to prove the importance of these technologies.

So if you don't spread it to 10,000 households, you're a failure.

These are some of the homes I visited for Intel's research.

Now, my fifth and final slogan. Over the last two years, it may seem like it's just around the corner, but anyway, I've been working hard to push the health care reform bill to make a real difference, whether it's moving from mainframe healthcare to an individualized healthcare structure or discussing the issue of public health insurance enactment and funding.

How you pay for your medical bills is not an important issue.

We just have to come up with something better in the next 10 years and try it.

Regardless of who pays for it, we have to do something fundamentally different: by recognizing the home and the patient, the family and the caregivers as part of the care team, and by using disruptive technology that already exists, to fundamentally change the way health care is delivered.

Our president should openly end the discussion of health care reform by saying, "The goal of this country is to move 50 percent of health care out of labs, clinics, hospitals and nursing homes into the home within 10 years."

This is possible, both economically and morally, and to improve the quality of life.

The current health care reform bill doesn't have any goals.

just messed up

This is my last message

How do we set a lunar-level goal to solve the Y2K +10 problem of the future?

New technologies and advancements will not completely solve this problem, but they will be part of the solution.

Unless we all work together to create a movement toward individual-centered medical care, in other words, a major goal of medical reform, there is nowhere to go.

Please turn this conference into such a movement.

Thank you very much

(applause)

I'm Jane McGonigal, a game designer.

I've been making online games for 10 years, and my goal for the next 10 years is to make saving the world in real life as easy as saving the world in online games.

We have a plan for that, but it will require convincing a lot of people, including you, to play more games in bigger and better games.

We currently spend 3 billion hours a week playing online games.

You may be wondering, "Do I spend that much time playing games?"

I'd say it's a lot, given how many real, pressing problems we have to solve.

But according to my research at the Institute for the Future, it's actually the opposite.

Three billion hours of gameplay a week isn't enough to solve the world's most pressing problems.

I believe that if we are to survive the next 100 years on Earth, we will need to dramatically increase this amount.

By my calculations, that's a total of 21 billion hours of gameplay per week.

This is probably counter-intuitive, so let me repeat it to make sense of it. If we're going to solve hunger, poverty, climate change, international conflict, obesity, by 2020, we'll need to be playing online games at least 21 billion hours a week. (Laughter)

i'm serious

let me explain this photo

It illustrates why I think games are so important to the survival of humanity in the future. (Laughter)

This is a portrait by a photographer named Philippe Toledano.

He wanted to capture the emotions of the person playing the game, so he placed the camera in front of the gamer as he played.

This picture shows typical emotions in games

Non-gamers may not understand the nuances shown in this photo.

A certain sense of urgency, a little bit of fear, extreme concentration, deep, deep immersion in a very difficult problem.

If you're a gamer, you'll notice the nuances here: The crow's feet and the corners of the mouth show signs of optimism.

This is what a gamer looks like on the brink of something called an epic win.

(Laughter) Ah, have you heard about it?

So there are gamers here too.

An epic win is something you didn't even think was possible until you achieved it, something that was exceptionally good.

It's almost unimaginable, and when you achieve it, you'll be shocked at how much you can do.

This is just before the epic win

In the next 100 years, we need millions of problem solvers around the world to look like this when they're tackling the toughest problems.

Unfortunately, this is the look that we see in everyday life when we're tackling urgent problems.

It's a face that says, "My life isn't going well."

I actually took a picture of me doing it Can you see it?

It's my face that says, "My life isn't going well."

Graffiti in my neighborhood in Berkeley, where I used to live, and I was researching why games work better than real life.

It's a problem many gamers have

We feel that in reality it doesn't work as well as it does in the game

Not just in terms of success, certainly in the gaming world.

you can accomplish more

Not only that, but it's also great because it motivates and encourages collaboration to do something important.

It's when you're in a game world that you're the best version of yourself.

In real life, when you face failure or hit an obstacle, you don't often feel that way.

Feeling overwhelmed and devastated, feeling anxious or depressed, frustrated and pessimistic

Games don't feel that way. They don't exist in games. That was when I was in grad school.

that's what i wanted to research

"There's nothing you can't achieve." What makes a game make you feel that way?

How can we take that feeling out of the game and apply it to the real world?

So we turned to World of Warcraft, which really is the ideal collaborative problem-solving environment.

And I've noticed some factors that make epic wins possible in the online world.

The first is that when you go into these online games, especially the world of World of Warcraft, you immediately see a lot of different characters who trust you to go on a mission to save the world.

The missions aren't random either, they match perfectly with your current level in the game.

so you can achieve

I am not given a challenge that I cannot achieve

But it's a challenge that's close to my limit, and I need to work hard.

There is no unemployment in World of Warcraft, no one sits idle, there is always something special and important to do.

And there are many collaborators

Wherever you go, there are hundreds of thousands of people waiting to help you accomplish your grand mission.

It's something you don't get easily in real life.

And then there are the epic stories, the stories that give meaning to who you are and what you do, and there's a lot of positive feedback.

You've heard things like level up, +1 strength, +1 intelligence.

It's something you don't see very often in real life.

When I finish this talk, I'm not going to get anything, like +1 Speaking, +1 Crazy Idea, +20 Crazy Idea.

Such feedback does not exist in reality.

The problem with these collaborative online environments is that the gratification of being on the verge of an epic win is so strong that you spend all your time in the game world.

It's a better world than reality

That's why World of Warcraft players have spent a total of 5.93 million years solving hypothetical problems on Azeroth.

this is not necessarily a bad thing

It may look bad

Let's put it in context, 5.93 million years ago, when our ancestors began to walk upright on two legs.

the first primate to stand upright

So if we're going to think about how much time we're spending in games right now in a meaningful way, we have to think about it on the scale of human evolution, which is pretty amazing.

It's also appropriate, because the time we spend playing games has really changed what we are capable of as human beings.

That's how we evolved into a supportive, warm-hearted species.

it's true i believe

I want you to consider an interesting piece of data, recently published by researchers at Carnegie Mellon University, that today, in countries with a strong gaming culture, the average young person will spend 10,000 hours playing online games by age 21.

10,000 hours is interesting for two reasons.

First, for an American child, 10,080 hours is the amount of time spent in school from 5th grade to high school, if you're perfect.

So you have two completely parallel educational paths: you spend as much time learning what it takes to be a good gamer as you do everything else in school.

Some of you may have read Gladwell's "Geniuses! Laws of Successful People." You may have heard his "10,000 Hours Theory of Success."

It's based on cognitive science research that if you study anything hard for 10,000 hours, you'll be a master at it, and by 21, you'll be a master at it.

You can become as good as the best people in the world.

If that's the case, then we have before us a whole generation of young virtuosos when it comes to gaming.

The big question here is, "What exactly are gamers improving on?"

If we knew that, we would have unprecedented human resources.

This chart shows how many people in the world today spend more than an hour a day playing online games.

They're the masters of the game. There are 500 million people who are outstanding in one thing.

And in the next 10 years, we're going to have another billion gamers, people who are exceptionally good at whatever they are.

you may not know

The gaming industry is developing consoles that run on less energy and work on wireless cellular networks instead of broadband, thereby bringing gamers from all over the world, especially those in India, China and Brazil, online.

In the next 10 years, there will be 1 billion more gamers.

That means we have 1.5 billion gamers

So I started thinking about how games make people masters.

I came up with four. The first is optimistic speed.

Think of it as strength self-motivation

Immediate optimism combines a desire to tackle a problem immediately with a belief that the odds of success are good.

Gamers always believe that epic wins are possible and that it's always worth the immediate challenge.

they never sit idle

Gamers are masters at building close-knit 'horizontal and vertical networks'

There's an interesting study that shows that after you've played a game with someone, you like them more, even if you've been badly beaten.

The reason is that it takes a lot of trust to get the game together.

I believe in spending time with you, in playing by the same rules, in valuing the same goals, and in sticking to the finish line.

Playing games together creates bonds, trust and cooperation.

As a result, stronger social relationships are built.

"productive bliss" is my favorite

There's a reason the average World of Warcraft gamer spends the equivalent of a half-day working 22 hours a week playing games.

We feel happier and work harder when we're playing games than when we're relaxing or hanging out.

Humans are optimized for difficult and meaningful work.

Gamers are always hard workers, given the right problem.

And finally, "magnificent significance."

Gamers love to dive into awe-inspiring missions in stories on the scale of humanity and Earth.

To give you an idea of ​​what this means, let me give you one trivia: You know Wikipedia, the world's largest wiki.

So what is the second largest wiki in the world? World of Warcraft wiki with over 80,000 entries

5 million people visit each month

They're putting together more information online than on any other topic written on the wiki.

they are building an epic story

We're building a massive knowledge resource about World of Warcraft.

These four superpowers converge into one being, and gamers are empowered, hopeful individuals.

People who believe that each person can change the world.

The only problem is that they think they can change the virtual world, not the real world.

this is the problem i'm trying to solve

There's an economist named Edward Castronova.

why do people have so much energy and

We're looking at how much time and money we're putting into the online world.

"It's safe to say that what we're seeing is a massive migration to virtual worlds and online gaming environments," he said.

And he's an economist, he's rational.

That guy... (laughs)... yeah, unlike me, I'm a brainy game designer.

This makes perfect sense, he says, because gamers can accomplish more in the online world than in real life, in games, than in real life.

You build stronger relationships, you get better feedback, and you feel more rewarded in the game than in real life.

Now it makes sense that gamers spend more time in virtual worlds than in real life.

I agree that it's reasonable now.

But this is by no means an optimal situation.

we need to make the real world more like a game

I was inspired by an event that happened 2,500 years ago.

This is an ancient die made from a sheep's leg joint.

Before we had cool game controllers, we used sheep bones.

And this is the first game device ever designed by man. If you're familiar with Herodotus' books, you may know this story: who invented the game and why.

Herodotus writes that the dice game was invented in the Kingdom of Lydia during a time of famine.

There was a very serious famine, and King Lydia thought it necessary to do something out of the ordinary.

people are suffering and fighting

It's an extreme situation. An extreme solution was called for.

So, according to Herodotus, they invented the game of dice and implemented a policy throughout the kingdom: on the first day everyone ate, and the next day everyone played a game.

We all got so caught up in the dice game that it was so engrossing that in all its satisfying, productive bliss, we forgot we had nothing to eat.

Play games the next day, eat the day after that

According to Herodotus, that's how they survived the famine for 18 years, eating one day and playing games one day.

This is exactly how we play games today.

We use games to forget the hardships of real life. We use games to escape from all the crazy things in the world and all the frustrations of real life. We get what we want from games.

but the story doesn't end there

It's very interesting

According to Herodotus, things didn't get better after the famine of the 18th year, so the king decided to play one final game of dice.

divide the whole kingdom in two

A game of dice is played, and the winner of the game wins an epic adventure.

They left Lydia to find a new place to live, leaving only enough people to survive on very little food, so that civilization could survive somewhere else.

you think it's crazy

But it was recently discovered that the ancient Lydians had the same DNA as the Etruscans who laid the foundations of the Roman Empire.

Scientists have proven the crazy story of Herodotus to be true.

Geologists have also found evidence of 20 years of global cooling that caused the famine.

Could this crazy story be true

They may have actually saved a civilization by playing a game, for 18 years they escaped into a game, inspired by it, and also learned to work together from the game, and so they actually saved an entire civilization.

we can do the same

We've been playing Warcraft since 1994

The first real-time strategy game in the World of Warcraft series

they played dice for 18 years

We've been playing Warcraft for 16 years too

I think we're ready to play an epic game ourselves.

They sent half their civilization out to explore the New World, and that's where the 21 billion hours of gaming per week come from.

Half of us will spend an hour a day playing games until the real world problem is solved.

You might ask, "How do you solve a real-world problem in a game?"

That's what I've been working on over the last few years at the Institute for the Future.

We have this banner in our office in Palo Alto, telling us how we can relate to the future.

we don't want to predict the future

I want to create the future

Envision the best-case scenario and empower people to make it a reality.

We envision an epic win and want to give people the means to achieve that epic win

Here are three games that people have created to try and give their future the means to create epic wins: World Without Oil.

made in 2007

An online game about surviving an oil shortage

The oil shortage is fictitious, but we're giving you enough online content to make you believe it's real, and then you'll live your life as if you've run out of oil.

You register where you live, and then real-time news videos tell you all sorts of things: how much is the price of oil, what's not available, how food and transportation are affected, schools are closed, riots are happening, and players have to figure out how to live as if it were real, and blog about it.

Post a video or photo

I tried against 1,700 players in 2007 and followed them for three years.

You could say this is a transformative experience

No one wants to change their life because it's good for the world, because it's supposed to.

But when you're immersed in an epic adventure, you realize you've run out of oil.

It turns into a story of great adventure.

Challenge yourself to see how you survive.

In our next save-the-world game, we took aim at a problem much higher and bigger than the oil crisis.

It's a game called Superstruct from Institute for the Future.

A supercomputer has calculated that there are only 23 years left for humankind on earth.

The name of the supercomputer is the "Earth Crisis Recognition System".

We recruited people, just like in the Bruckheimer movies.

You know that Jerry Bruckheimer movie about a dream team of astronauts, scientists and ex-criminals who are tasked with saving the world.

(Laughter) In our case, the dream team isn't just five people, it's all the dream team, coming up with the energy of the future, the food of the future, the health of the future, the security of the future, the safety net of the future.

8,000 people played this game for 8 weeks

We've come up with 500 very creative solutions, search for "Superstruct"

And finally, our newest game, Evoke, which will launch on March 3rd, made with the World Bank Institute.

Completing this game will earn you the Social Innovator 2010 certification from the World Bank Institute.

We are partnering with many universities in sub-Saharan Africa and inviting them to learn social innovation skills.

We also have comics to level up your skills in field insights, knowledge networks, sustainability, vision and resourcefulness.

I want you to spread this game to young people all over the world, especially to people in the developing world.

Let's wrap up

I have one question

What will happen next?

There are a lot of great gamers out there, and there are games that are kind of testing the future, but none of them have saved the real world yet.

I think you'll agree that gamers are human resources that can be put to work in real life, and that games are a powerful platform for change.

We have these amazing superpowers: a state of productive bliss, the ability to network vertically and horizontally, optimism on the fly, and a thirst for grandiose significance.

I hope that we can all come together and play meaningful games and survive the next 100 years on earth.

It's my hope that you will join us in making and playing games like this.

As we look to the next decade, we know two things for sure: we can create any future we can imagine, and we can play any game we want.Let's start playing games that change the world.

thank you very much

(applause)

Kurt Anderson: Like many architects, David likes attention, but he's also quite reserved, or at least pretends to be, so he asked me to ask questions rather than talk.

In fact, I think what I'm about to talk about is a topic that's better suited as a conversation than a lecture.

Let's see the news video first.

(Dan Rather) Since the attacks on the World Trade Center on September 11th, thousands of people have gathered in New York City to mourn the victims in a 65,000-square-foot cemetery.

Jim Axelrod of CBS reports on the finishing touches to the new construction that was set up for site visits and tours.

(Jim Axelrod) The Statue of Liberty and the Empire State Building are old.

The most crowded place in New York is the new Ground Zero.

(Tourist) I brought my daughter from Indianapolis.

Of all the tourist spots in New York City, I wanted to come here the most.

(Jim) Thousands are lining up on Lower Broadway.

(Tourist) Ever since that incident, I've wanted to come here.

(Jim) Even in the cold of winter

people are praying and remembering

(Tourist) This is what really happened to us here.

it's our place

(Jim) There are so many people that it's a problem whether you can see the site. (Tourist) Everyone, get close.

I think it's very dissatisfying because I can't see what it looks like

(Jim) That situation is about to change.

In what may be the fastest time in history, a team of architects and builders are designing and building a viewing platform that will ease visitor frustration and give them a closer look at the site.

(Male) It's a spectacular panorama that allows visitors to more fully comprehend the full extent of the devastation that has taken place in this place.

CA: If you think about it, Ground Zero is different than many other tourist destinations in America.

Unlike the Grand Canyon or Mount Rushmore in Washington, people come here to see things that no longer exist.

(David Rockwell) So when people first see this place, it's not as a building site, but as a very moving cemetery.

JM: The walls are intentionally left bare so that the border walls can be decorated with memorial items, as has already been done.

(Tourist) I put my heart into it, because we are also involved.

JM: The ramps are made out of a simple material, a kind of plywood you'd find on a construction site, because it's about construction.

In the face of the worst vandalism in American history, rebuilding has begun.

Reported from New York

Kurt: This building, at first glance, doesn't connect to the sensuous story -- David, you -- I hate to call you that -- but you're known as an entertaining architect.

Your work is highly sensual and even hedonistic.

(David) I like that word.

(Kart) Pleasure is the theme of casinos, hotels, restaurants, etc.

So for you, how did the shock that all of us, especially the people of New York, felt on September 11th turn into the desire to create something like this?

David: The truth is, after September 11th, my role was originally -- as a Tribeca resident, as a neighbor whose neighborhood has been destroyed, as a person who works right next door, to ensure that the 100 people who work in my office have the same passion for architecture that they've been working on.

In fact, I was nearing completion of a book entitled "Pleasure," a book about sensual pleasure in space.

But there was an incident that made it impossible to finish it.

because I was in a stupor

On the Friday immediately after September 11th -- two days after the incident -- everyone found themselves in a state of total lack of motivation.

So I gave everyone in the office a few days off.

In talking to other architects about this, some people in the media were saying that we should recreate the old twin towers, say we should add 50 more floors.

I couldn't believe my eyes, because before people's wounds had healed, they speculated as if it were a competition.

We had a number of discussions, first with Rick Scofidio and Liz Diller, who worked with us on this project, and then with a few others, and it made me realize that whatever we do, we have to find utility.

And the ultimate way to help, as a placemaker, is to reach out now, instead of pompous or hypothetical.

So we thought, let's work together to create something like a special forces unit of design.

That was the mission we came up with.

Kurt: As a designer, until then, your job was to satisfy people's desires.

CA: What I was conscious of was the overwhelming need to act now.

I've had requests to participate in several projects before this.

A school called PS234 has been evacuated from Ground Zero.

had moved to an abandoned school

We took 20 to 30 architects, designers, artists, and in four days, it was like raising a barn in the city, and everyone offered to help.

it was great

Thanks to Tom Otanez and Maria Kalman for their contributions, it was an exhilarating and pleasant experience.

(Kurt) The work was done quickly. It took about three weeks or so—it was completed around October 8th.

(David) Yes

CA: Of course, when you've taken on something as big as this project -- it's just one of four buildings you've designed around the site -- you've faced a very complex, incomprehensible, inflexible bureaucracy and power that's ingrained in New York's real estate industry and city administration.

(David) It's funny.

When we completed the PS234, we had a small dinner together.

In fact, I was approached by the American Institute of Architects if I wanted to be president of the Reconstruction Commission.

I have attended several conferences

There was the most tortuous grand scheme of all, involving long-term infrastructure development and the rebuilding of the entire city.

But the reality is that we have hurt people in front of us, we have needs to meet, we have discussions about inclusivity, we need an inclusive process.

The commission was not an all-encompassing group.

So— (Kurt) you said it wasn't inclusive?

(David) That's right.

It was overwhelmingly white, wealthy, pro-business, and hardly representative of the city.

(Kart) Shocking.

(David) Yeah, it's a surprise.

Rick, Liz, Kevin and I came up with an idea.

Actually, there was an approach from the city.

We were originally talking to the city about Pier 94.

I used PS234 as a reference

As a place to support the victims' bereaved families, this wharf was set up with a complete disregard for dignity.

(Kurt) Is it the Hudson River?

David: Well, initially I spoke to Tim Zagat, then Kristin Nicholas, and then finally to Mayor Giuliani, who said, "I don't think we're going to do anything about Pier 94 right now, but we want Ground Zero to have an observatory for the families of the deceased, and make it a more dignified place for the families who come to visit, and it's weather protected."

So Rick, Liz, Kevin and I visited the site, and it was the most moving experience of my life.

It was a very heartbreaking sight, with letters from the victims' bereaved family members left behind in a humble structure of plywood with a handrail.

Nothing stands between us and the disaster that happened

It was a vivid sight

I still remember September 11th. I could see the World Trade Center from the roof of my building on 14th Street.

Everyone was gathered on the roof, so I ran to the roof too.

It was amazing how much more incredible it was to see it in person than to see it on TV.

I felt that there was something about the sense of security brought about by what was in between, and the amount of information that intervened between people and their actual experiences.

Witnessing this incident in a very naive but dignified way was an intense experience.

So we told the city officials that we weren't really interested in converting the site into a VIP one, but we spent some time there.

At that time, there was just a need in the city.

The city wanted to deal with the fact that 30,000 to 40,000 people per day gathered at the site with nowhere to go.

I was having a hard time because the area around me was very crowded.

So dealing with the flow of people was the immediate goal.

Building some kind of road so that people can move around the site.

CA: But you've found a way, skipping the mind-boggling process of getting permission and getting involved, but you've got funding for this project.

It looks pretty simple, but it's a half-million-dollar project, right?

CA: I knew it wouldn't happen without private funding.

And let's be honest, if it doesn't happen within Mayor Giuliani's term, all the people we've been dealing with, the Department of Transportation, the Metropolitan Police, we've met with 20 or 30 people in one meeting with the city, and we've convened the Emergency Response Committee.

I think he really wanted to do this project, and felt the need to do it.

Kurt: So it was time, because Mayor Giuliani was set to step down in three months.

David: Well, first we had to find a way to make it happen.

It's bad if you build it on your own

And then I didn't want to attract too many voices of dissent, so I had to do it as quietly as possible with as little attention as possible in New York.

I even thought about starting a foundation, mainly because I found a builder, but they weren't willing to do it, even though I would pay them.

had to set up a foundation

What actually happened when we set up the foundation was that one of New York's most influential developers - (Kurt) withholding his name?

David: Yes, his initials are JS, the owner of Rockefeller Center, and as some of you may have guessed, this guy offered to help.

I met you there

The amount offered by the builder was between $500,000 and $700,000.

Atlantic Height, the nation's largest scaffolding company, offered to do it for a fee.

And this developer said, "I'll pay the full price."

I am very grateful

I believe this was on the 21st, and we knew we had to finish construction by the 28th.

Construction started the next day

We had a meeting with the developer's chosen contractor that night, and he brought in half the blueprints that we had drawn.

(Kart) When you get excited, you say, "What is this miniature?"

(Laughter) (Rockwell) I thought it was a blueprint for window cleaning scaffolding.

It just didn't feel right next to St. Paul's Church, or the concept of dignifying it and making it a place people would look back on and remember.

Anyway, in the meantime, we've spent a lot of time planning and observing the movements of people around the ruins of St. Paul's Church, which you can see on the right side of the picture.

I used to live in the area and I've seen what people want.

I think people were surprised for two reasons. First, they were overwhelmed by the scale of the destruction.

It's like the daily heroism of New Yorkers.

In this meeting, the contractor literally said, "I'm going to lock the door, because the developers don't want you to leave until you agree."

We were like, 'This is half the plan, it just doesn't have the kind of design that people in the city want.

I have to return to a blank slate," he said.

I persuaded the contractor that I would not return until we agreed to build to the original design.

The next day, I got an email from the developer saying they were discontinuing all support.

I was at a loss, but decided to spread my hands wide.

I reached out to as many people as I could by email, and there were a few people in the room who helped out.

(Kurt) You weren't thinking of pulling back?

CA: No, I let the contractor go ahead with the plan.

With my go-ahead, the building materials had already been ordered.

I knew this had to be done somehow.

There was also the feeling that I just had to make it happen.

(Kurt) Self-funding and donations, and foundations were the source of funds.

Earlier today, Richard gave me a very valid story, in a talk before the chair designers came out, about the history of chair designers who brought aesthetic solutions to the universal, mundane and ordinary problems associated with sitting.

It seems to me that this is the opposite case.

This was a unique design problem that had never been seen before.

CA: I'd like to address the problem.

They said it was important not to be classified as a "monument."

This was supposed to be a quiet place for people to reflect and refresh their memories.

So, using design, for the bereaved families, the observatory was designed to have as little interference as possible between the viewer and the experience.

All of them use very rustic building materials.

scaffolding and plywood

It's a kind of marching movement, going up on the side of St. Paul's Church and down on the other side, but you're four meters above the ground and you have to climb about 90 meters to get a 360-degree view.

The design had to be fast, cheap, safe, polite and flexible.

Another aspect is that it was designed to be mobile.

Because of the four observatories around the site, one of which was a converted observatory for bereaved families, we knew they had to be able to move in response to changing circumstances, according to the changing meaning of "Ground Zero."

KM: Your work -- as I said before -- is a lot of what you believe in, and it reflects what you focus on: the transience and the transience of all things.

this is not a permanent piece

After a few years, it will disappear from this place.

Did this force you to think in new ways as an architect?

Did you think it was a completely temporary installation?

(David) No, I don't think so.

Of course, this work is decidedly different by its very nature from anything we've tried before.

One of the things that overlaps with how we think about work as a whole is, first of all, the idea that collaboration is a way of doing things.

Kevin Kennon, Rick Scofidio, Liz Diller, all the people in town -- Norman Lear came to me four hours before the deadline for the grant, and he offered to take over until the grant came out.

I think it's a work that emphasizes how important this idea of ​​collaboration is.

As for the ephemeral nature, the goal in this project was not to build something that would stay there longer than it should have.

What we were most interested in was to encourage a kind of dialogue that we thought wasn't being done enough in this city, about what's going on here right now.

A day or two before the opening, in Mayor Giuliani's farewell speech, he said he thought the whole of Ground Zero would be a monument.

It caused a lot of discussion, but it also got a lot of sympathy.

I think that whatever the person's position is about how this sacred land should be used, opinions generated by actually confronting and seeing them can create a much stronger dialogue.

our interest was there

It fell into the very realm of things I'd been interested in before.

Kurt: It seems like a particularly nice civic facility.

It encourages that kind of dialogue to be taken more seriously.

And now, half a year after the incident, it's only a few months away from the site being cleaned up, and before I knew it, serious conversations were taking place about what should be installed on this site.

Do you have any thoughts on what we should or shouldn't do based on the fact that we were actually involved in this field through this project?

CA: One of the things you shouldn't do is valuation. The current debate is a very closed debate about master plans.

There was a recent exhibition of architectural ideas at the Protet Gallery, and I saw some very ingenious architectural ideas.

(Kart) You had some terrible ideas.

CA: There was a bit of an idea war, but the focus of an idea should be on the plan and its use.

There should be an expansion, and it's happening -- it's an open dialogue that says, "What is this place?"

I strongly believe that until the memorial issue is sorted out, it will be very difficult to have an intellectual discussion.

There are also some arguments that I think are very positive right now about lowering the West Side Highway so that it can be connected to a single stretch of land.

(Kurt) That's interesting, and there are other things that I was hesitant to discuss six months ago.

Now, there's a problem that we might be able to talk about, which is that the World Trade Center wasn't really loved as an architecture -- including what it did to the city and the huge plaza.

Is this an opportunity, a ray of hope, a ray of hope, an opportunity to rebuild some of the more traditional urban parcels?

CA: I think it's a great time to discuss why we live in cities.

Why do we live in a place where diverse people clash every day?

This doesn't change even if we build 50,000, 60,000, 70,000, 80,000 new offices, it's not about numbers.

So it's going to be an opportunity to rethink how we think about cities.

In fact, there's been a proposal for a 7th building.

(Kurt) The building just north of the Towers?

(David) Yes, that's where the Towers fell.

The reason for this delay was ultimately due to public anger at the city government's failure to open up the streets that connect the site to the city.

I would love to see a public dialogue -- an international competition to solicit ideas for uses.

(Kurt) Art and housing – commercial facilities of any size?

David: Yeah, we're looking at other things.

Our little foundation is looking for other ways.

For example, using a small piece of land around the site, you could hire 10 as-yet-unknown New York architects to build artist residences.

Instead of one-size-fits-all thinking, we look for other ways to encourage discussion to focus more on diversity.

Kurt: Lastly, I heard that you have a video of your actual visit to this observatory?

CA: John Kamen -- who's actually in this room -- has put together a two-and-a-half-minute video about the use of the observatory.

I'm going to show you that and finish

I'm shooting from the west side of Fulton Street.

One of the challenges we had with Giuliani was forgetting that the mayor was adamantly anti-graffiti.

We designed this observatory essentially to be graffitied.

(Kurt) It's certainly not a monument.

Were you aware of the monument? vietnam war memorial

Anything like that?

CA: Of course, I gathered as much information as I could, and I was also conscious of other monuments.

It's the complexity and the amount of time it takes.

The Oklahoma City committee, for example, has 350 people on it, which is why we thought of this as a temporary stopgap solution, which extended to Union Square and the temporary monument that already existed.

This scaffolding is built over the street and can be removed.

What's interesting here is that the nature of this place has completely changed, so what you're feeling is not just the destruction of the building that was at Ground Zero, but the destruction of all the buildings around it -- and the scarring of the surrounding buildings, which is huge.

Here you can see St. Paul's Church on your left.

CA: On behalf of the people of New York, I want to thank you for making this possible and making this possible.

The fact that it was built virtually immediately after the event, and the fact that it's already there before the response to it has even taken a break after such an event, is what makes this building -- and I don't know if I'd call it a beauty -- what makes it so wonderful.

(Rockwell) It was an honor.

I am very happy to be able to show you here.

I was going to tell you a scary story, right?

I want you to be afraid too, but for a different reason than you might imagine.

What you should really fear is -- first slide -- you're out -- and you'll miss your chance.

If you spend this week thinking about Iraq, President Bush, or the stock market, you're missing out on one of the greatest adventures in human history.

This story is about that adventure

This is the crystallized DNA

All life on this planet -- all insects, bacteria, plants, animals, humans, politicians -- (Laughter) is coded and recorded in this.

And a single crystal of DNA looks like this.

we're finally starting to understand

This is the most exciting adventure ever-

The greatest mapping project

If the completion of the map of America, the landing on the moon, etc. made a difference, then this map of our own and of all plants, insects, bacteria, etc., also makes a big difference.

And they're starting to tell us a lot about evolution -- (Laughter).

And it's starting to tell us a lot about evolution -- (Laughter) -- this substance, as Richard Dawkins said in his book, is exactly like the river that flowed out of Eden.

So the 3.2 billion base pairs in every cell of yours are billions of years of your history.

And we can go back in time and change medicine and archeology, and we can go back in time and change medicine and archeology.

It seems that the human race diverged wildly between white Europeans and black Africans 700 years ago.

European whites were exposed to the plague and-

Most of those exposed did not survive, but those who did have mutations in the CCR5 receptor.

Because they survived, they passed the mutation on to their children, under tremendous demographic pressure.

Because there were no cities in Africa, there was no demographic pressure to choose the CCR5 mutation.

This can be determined to have happened 700 years ago.

And this is one of the reasons why AIDS spread so quickly in Africa and less so in Europe.

And tidbits like this are coming to light about malaria, sickle cell disease, and cancer.

mapping ourselves is the greatest adventure ever

And this Friday, give these two a toast to some very fine wine.

Fifty years ago, on Friday, the day Watson and Crick discovered the structure of DNA, this day is as special as February 12th [2001] when we finished mapping the human genome, but we'll talk about that later.

First, let's talk about the new zoo.

I'm sure you already know all about DNA and its role, but some of our discoveries are cool, and this is the most abundant species on earth.

Do you think humans and cockroaches are thriving? There are actually 10 trillion Plurococcus,

We didn't even know it existed. That's the importance of a whole species mapping project. Here's the importance of a whole species mapping project.

We're just beginning to understand where we come from and who we are We're just beginning to understand where we come from and who we are

There are also discoveries like this amoeba dubia

It doesn't sound like much of an organism, but it has 3.2 billion genetic codes that make you who you are. This is the number of bases in your genetic code in your cells.

This little guy had genes 200 times bigger than you.

If you think about a good information storage system, it's not the chip,

It may become something like this amoeba.

Again, we're starting to learn how life works from life.

This little quirky creature: Everyone thought there was no point in taking a sample from a nuclear reactor, because it would be dangerous and nothing would be alive.

Finally someone got out a microscope and looked into the water where the nuclear fuel was soaked, and there was

Deinococcus radiodurans was doing the backstroke.Deinococcus radiodurans was doing the backstroke.In the radiation dose, which is 200 times the lethal dose for humans, it destroys its chromosomes 6 or 7 times a day and lives by repairing them.

I'm sure you've realized how diverse and important and interesting this search for life is, how many different forms of life there are, how different forms of life can exist in different places, and maybe even beyond this planet.

If we can live in this kind of radiation, it raises an interesting new question.

Even this small life form whose existence was not known

It should have been known originally, because it's the only visible bacterium.

This organism measures 0.75 mm and lives in a trench off the coast of Namibia.

This life is 0.75 mm in size and lives in a trench off the coast of Namibia.

When you see namibiensis, you're looking at the largest bacterium.

This life is as big as a period

Again, three years ago, we didn't know this life existed.

The adventure of life in the new zoo is just beginning.

This is a really weird guy named Ferroplasma.

Ferroplasma is interesting because it eats iron -- it lives in an acidic environment, like in a battery -- and it excretes sulfuric acid.

When you study these strange creatures and how they lived, it turned out that they were actually very efficient organisms, and they're called archaea, the archaic ones.

And the reason why they are "ancient" is because when they were born, this earth was covered in something like the sulfuric acid in a battery, and this earth was covered in something like the sulfuric acid in a battery, and they were one with the molten core, and at that time they were eating iron.

So this little adventure isn't just about dogs and cats and whales and dolphins.

The fear you should be feeling is temporary -- the constant focus.

George Bush will be gone soon, right? life is different

Whether humans survive or not, they will continue to live on this planet and other planets.

And this DNA code is just beginning to unravel, and it really is the most exciting intellectual adventure we've ever been on.

You can do all sorts of weird things with it. This is a baby gar.

Conservation groups are trying their best to breed this endangered animal.

They couldn't reproduce naturally, so they took a spoon and took a cell, a code, from the mouth of an adult gar.

That way the cow will give birth to a gar.

Now they're experimenting with bongos, pandas, Elim, Sumatran tigers, and Australians -- bless them -- are playing with them.

The last Tasmanian tiger was found in September 1936.

Died at Hobart Zoo

But as we learn more about the genetic code and how life is programmed, it seems that we can fill in the genetic gaps in our degraded DNA.

And if you learn how to fill in the gaps, you'll have complete DNA.

Then you can put it in a wolf's egg and give birth to an animal that hasn't been on this planet since 1936.

And you can go even further back and think about dodos and other species.

Other places, like Maryland, are thinking about distant ancestors.

Because each of us has all of our genetic code for the last billion years, and we've evolved from there, so we can trace our evolutionary tree, and as we learn to reprogram, we may be able to create the most primitive forms of life.

Everything didn't exist five years ago

produced in such facilities

A gene sequencing facility the size of a football field

Both public and private facilities

$5 billion for first person sequencing

The second one cost about $3 million

Over the next five to eight years, $1,000 will make genomic information available.

All of your genetic information will be recorded on a CD.

this is such a boring information

(Laughter) This is life, isn't it amazing?

Laurie will talk about this later.

If it's in your body, you're in big trouble, because it's Ebola code.

one of the most dangerous diseases

But plants, insects and apples all operate on the same principle.

This apple is the same as a floppy

This is a code of 1's and 0's, and this is an A T C G code, where the branches of the tree store energy while doing photosynthesis, and when that's done, you press the "execute" button and it does this (falling sound).

(Laughter) When you hit the EXE and "run," what's happening is that the first part of the code, AATCAGGGACCC, tells you to root, and it reads and executes it.

The following code is: Make a trunk

Next: Make a flower that's white, blooms in spring, and smells like this

The fact that we have this code and how to read it means that the first plant was cracked two years ago, the first human information was cracked two years ago, and the first insect was cracked two years ago.

The very first decipherment was done in 1995 by a small bacterium called Haemophilus influenzae.

If you own the source code, you can reprogram it and reprogram the organism to make it a vaccine or make biomaterials, which is why DuPont is able to make silky polyester in corn.

This changes all the laws, we reprogram our lives.

This is you This is one of your chromosomes

And now what we can do is, all of the chromosomes are unfolded here, and the genetic code that's on the chromosomes is here, and it's working, and it's the code of other organisms that are similar, and we can link it to the literature.

Today, when you go home and connect to the internet, you have access to the world's largest public library, the library of life.

And it can do strange things, like reprogramming apples, in Cliff Tabin's lab at Harvard Medical School, reprogramming chicken embryos to increase the number of wings.

I am not a restaurant owner.

(Laughter) The reason I programmed it to grow extra wings is because when I was a kid, I was playing with a lizard, and when I picked it up, sometimes the tail came off, and then it grew back.

Humans don't work that way. If you cut off an arm or a leg, it won't grow back.

But all of your cells carry the entire genetic code, and they can all be reprogrammed, if you don't stop researching stem cells, and stop researching the genes that express various bodily functions.

By studying how chickens grow wings, and by studying the programs that differentiate cells, what we can do is stop cells that don't differentiate, that is, cancer cells. And another thing I want to learn is how to reprogram cells like stem cells to develop bone, stomach, skin, pancreas, and so on.

And in the not too distant future, you and your children will be living with artificially grown body parts in a world where research never stops.

How is that possible? Each of you is only 1 in 1,000 different in 3 percent of your overall genetic code, or 0.003 percent. Small differences in punctuation and phrasing can make a big difference. Let's look at a very simple sentence.

(laughs) Right?

It's a clear statement, and when a man reads it, it says, "A woman is helpless without a man."

May I?

And the woman sees this sentence and points out the mistake.

If you really read like this

"Woman: Without her, a man is helpless." (Laughter) That's what genes do.

A difference of 1 in 1000 is what makes you different from the person next to you.

right? This guy looks good, but...

don't touch it

This is also possible without punctuation changes

See this (The IRS: Internal Revenue Service)

they read this differently

If you read it from their point of view, it goes like this [Theirs: their] (laughter).

If you read it from their point of view, it goes like this [Theirs] (Laughter) Now you can make the difference with the same genes -- you have 30,000 genes, and your husband and the mouse have 30,000 genes --

A mouse and a husband are the same.

Even if the letters of the genetic code are the same, making very small changes can make a big difference in the results.

This is what genes do every day

Because of this, it doesn't necessarily take a lot of changes for a human cell to become cancerous.

This little chip is the size of a credit card

60,000 types of genetic diseases can be tested

There are issues of privacy and insurance terms, but it allows us to track the disease, and when we used it to test patients with leukemia, we found that three diseases that had exactly the same symptoms were actually completely different diseases.

This gene is overexpressed in ALL leukemia.

MLL is the middle gene and AML is the bottom gene.

If one of these is overexpressed, take Gleevec and you'll be fine.

If not, if one of these specific genes is missing, don't take Gleevec.

it has no effect

So is Receptin for breast cancer.

Don't take Receptin if you don't have HER-2 receptors

The essence of medicine will change The expectations of medicine will change

change the effect of the drug

This was the greatest reservoir of knowledge when we were in college, but it doesn't really matter anymore.

The amount of printed data stored in the Library of Congress is less than the amount of data produced by the number of chemical compounds produced by the good genetic companies each month.

I'll say it again: A single genetic company produces more compound data each month than the printed pages in the Library of Congress.

This is what drives the American economy: Moore's Law.

As we all know, the price of a computer halves every 18 months, and the power doubles, right?

But if you compare this to the speed at which genetic data is accumulated in genebanks, Moore's Law is right here, the blue line.

This is a logarithmic axis, and this is what I would call super-rapid growth.

This works to make computers grow faster than ever, because there's never been a use case for computers that's grown faster than Moore's Law, but it's going to grow.

here is an interesting map

This map was completed by Harvard Business School

Given that this vast amount of data is free, who is using it? That's an interesting question, this is the largest public library in the world.

According to this map, it appears that about 27 trillion bits have moved within the United States, about 4.6 trillion bits have moved to European countries, about 5.5 trillion have gone to Japan, but almost nothing has returned from Japan, and no other country can read this library.

It's free, but nobody reads it. People are focused on war and Bush, not life.

this is the new world map

This is the world where the genome can be read, and this is the problem.

It's not actually a readable "world"

Can be divided into "states"

And with the ability to read the language of life, we see states rise and fall, and we see New York fall, New Jersey fall, and new intellectual empires rise.

It's also divided by county, because a particular county

To be even more specific, look at a specific zip code.

(Laughter) You want to know where life is happening?

For Southern California, it's happening at 92121.

It's in the triangle of Salk, Scripps, and UCSD called Treypine Street.

That means you don't have to be a big country to be successful, you don't have to have a lot of people, and most of the wealth in the country is moving in three or four carefully selected places.

Massachusetts is the same, it's a little spread out, but by the way, the neighborhoods with the same color are next to each other.

What impact will this have?

The difference between the poorest and the richest in agricultural societies was 5 to 1 between the most productive and the least productive. Why?

In agriculture, if you have 10 children, born a little earlier and work a little more, on average, you can create about five times as much wealth as your neighbors.

In the knowledge society, this number is 427 to 1.

It's really important to be able to read and write, not just English, French, German, but also the languages ​​used by Microsoft, Linux and Apple.

And soon reading and writing the code of life will also be important.

So what you should be afraid of is turning your back on what's important.

A literate person in life becomes important

The rise and fall of a country depends on it

As far back as the 1870s, the most productive per capita country on Earth is Australia, and so is New Zealand.

In the 1950s, the United States rose to the top, Switzerland in 1973, and then the United States came back on top, beating out chocolate and cuckoo clocks.

Today, as we all know, Luxembourg is the most productive country, producing 1.3 times more wealth per capita than Americans.

It's a small, landlocked country with no oil, no diamonds, no natural resources.

Smart people move the bits, there's another rule at work here.

Next is specific productivity

How many people does it take to get one US patent?

3,000 Americans, 6,000 Koreans, 14,000 British, 790,000 Argentinians.

inflation is irrelevant

Privatization doesn't matter

If you put an economist from Harvard at the head of Argentina, and people who don't understand the changing rules, the country will go bankrupt.

And Indians need 5.6 million

Let's see what happens in India

India and China accounted for 40% of the global economy during the industrial revolution, and now they are 4.8%.

Two billion people, one-third of the world's population, produces only five percent of the wealth, because they didn't catch the change, they continued to treat people like serfs instead of co-investors in the project.

didn't hold back educated people

Didn't encourage business and didn't do an IPO

Silicon Valley did, and that's why they say Silicon Valley is "powered by ICs."

Indian (I) and Chinese (C), not integrated circuits.

(Laughter) This is how the world works.

When the United Nations was founded in 1950, there were only 50 countries in the world.

now there are 192 countries

Countries are splitting, splitting, rising, falling -- becoming more and more fragmented -- and the trend continues.

1990s These sovereign states didn't exist before 1990.

This doesn't include national integration, name changes, flag changes.

3.12 nations are born each year

People want to run their own countries, with good or bad results.

And what's really interesting is that you and your children can easily build an empire.

(Music) Now that the music is over, I was going to talk about how your genetic code works and how you can use it to build your wealth.

Moderator: Two minutes left

(Laughter) Fan: No, let's stop here and let's talk about that next year.

Thank you. (Applause)

They asked me to come shoot a movie called "Elizabeth."

We talked about this great Englishman, "This wonderful woman who has done so much.

How can I make it appear?"

People in the studio, producers, and scriptwriters sat around a table and asked, "What's the director thinking?"

I replied, "I think he was someone who liked to dance."

I saw people looking at me, someone said, "It's Bollywood."

"How much did you pay to hire him?" said another

Some people said, "Let's find another director."

I think we should change our policy

We had a lot of discussions about how to draw Elizabeth, and I said, "Yes, maybe it's a little too Bollywood."

"That great Elizabeth was dancing?

It is a such a fool"

I thought about the whole thing again, and the story came together.

This is how we introduced Britain's great "Queen Elizabeth."

Earl of Leicester: Mistress, may I come with you?

Elizabeth: If you want

(music) Kapoor: Look, she was dancing

If you watch this movie, you'll see that Elizabeth is in love, and that she was really pure and happy and youthful.

Who didn't understand?

This is the power of visual storytelling, this is the power of dance, this is the power of music, this is the power of ignorance.

Whenever I make a film, I overprepare and overthink with my crew.

knowledge weighs on wisdom

Simple words are drowning in the quagmire of experience.

So I say, "What are you going to do today?" Instead of doing what I had planned, I let myself go into complete panic.

It's a way of letting yourself go, saying, "You know what you're going to do today, you've been directing for years."

get rid of thoughts

I go to the filming location and I'm in complete panic.

It's a symbolic gesture: tearing up the script, panicking and fear.

I still do. Look. I'm nervous. I don't know what to say or do. I hate going to the studio.

But when I arrive, the AD says, "You know what's going on today, don't you?" I say, "Of course."

The studio executives will say, "Well, Shekhar, we're ready."

In my head, Nusrat Fateh Ali Khan, because his music is chaotic.

I throw myself into chaos because I think some truth will come out of chaos.

All preparation is just preparation

is it sincere

I don't even know if it's true

Truth always comes naturally in a moment, and if you can weave five wonderfully vivid moments into a story or a film, your audience will see it too.

I'm searching for those moments, and I'm in the studio wondering, "What am I going to say?"

At the end of the day, everyone is watching. At 6:45, 200 people are at the studio, and I arrive at 7:00 and they say, "Where are we going to start? What are we going to do?"

I'm going into a panic that I don't understand, I don't understand

I don't know, so I pray to the universe for something. I face the universe the way Einstein did. I look for the same sources as his equations. Creativity comes from outside of yourself.

wait for something to come and inspire

I won't start shooting until I have an epiphany

What do you do?

Kate says, "How do you want me to act?"

I said, "Kate, what do you want to do? (Laughter) You're a great actress, I'll leave it to you guys, can you show me what you want to do?"

(laughs) What are you doing? I'm buying time

I'm trying to buy time

What I've been doing ever since I first learned about storytelling is panic.

Panic brings out the most creativity, and panic is the only way out of your sanity.

throw away your sanity

Throw it away

Let's go from there to the universe There's something closer to the truth than your mind, than your universe

I keep doing this over and over, I do it all the time to get the Sunata, the open mind.

Creativity comes from emptiness

this is how i do it

When I was a kid, I think I was about eight years old.

Do you know old India? There was no pollution.

In Delhi we lived in chathas and kotas.

Kota now has a bad meaning, it's a tavern-style terrace, and we slept outside at night.

I was just learning physics in school, and I was told that everything in existence can be measured.

If you can't measure it, it doesn't exist

At night, lying under a clear night sky, the air was clean in my boyhood Delhi, and I used to look up at the sky and say, "How big is the universe?"

my father was a doctor

When I asked, "How far is the universe?"

"The universe continues forever," my father replied

So I said, "Measure eternity, I was taught in school that there is nothing you can't measure.

It would be strange if we could not measure it," he said.

How long will eternity last

I don't know what eternity means

There were times when I cried and cried at night because I couldn't create what I imagined.

so what did i do?

At the age of seven, I created a story.

what kind of story?

I don't know why, but I remember

A lumberjack picked up an ax and was about to chop firewood, and the whole universe was a single atom in that ax.

When the ax splits the wood, everything is destroyed and the big bang happens again.

But before the big bang, there were lumberjacks.

As the story came to an end, I thought the lumberjack's universe was an atom in another lumberjack's axe.

So I was able to tell the story over and over again, and it helped me get over my problems.

I got over it by telling a story

What is a story then?

Stories are everything we are We are the stories we tell

We live in the duality of whether we exist or not, who we are, but the stories we tell ourselves are the testament to the possibilities of our existence.

we are the stories we tell

And this is the breadth of the story

A story is the relationship between ourselves, our potential selves, and the infinite world, and that's our mythology.

We tell stories, no one is without a story.

By telling stories and following his own stories, Einstein found theories, and from there he came up with equations.

Alexander the Great set out to conquer the world based on a story his mother told him long ago.

everyone has their own story

and tell a story to yourself

Let me be more specific: I tell the story, therefore I am

We exist because we have a story, we wouldn't exist without a story.

we create stories to establish ourselves

If you don't make a story, you'll probably end up insane.

I can't say for sure, but I always think so.

let's talk about movies

the movie tells a story

I'm thinking about making a film about Buddha, and sometimes I wonder: If Buddha had the same elements that a filmmaker has -- music, video, and a video camera -- would Buddhism be easier to understand?

But it's a pressure

I have to tell the story better, but with subtext.

it might be possible

When I first went to Hollywood, I mentioned subtext a lot, and my agent said, "Don't talk about it."

When I asked why, he said, "If you say subtext - no one will let me make a movie.

Just talk about the plot, how well you can shoot it, how the film will turn out."

When judging a movie, we look at things like this: the plot level of the story, the psychological level of the story, the political level, and even the mythological level of the story.

Consider the story at each level

These stories don't have to match each other.

Surprisingly, in many cases, on each level, the stories contradict each other.

When I work with the great musician Rahman, I often say, "Instead of following what the script says,

find out what i didn't write

Look for your truth.When you find the truth,it may contradict the plot.But don't worry."

'Elizabeth: The Golden Age' is the sequel to 'Elizabeth'.

When I made the sequel, the scriptwriter said that a woman threatened by Felipe II who was about to start a war fell in love with Walter Raleigh.

I've fallen in love with Walter Raleigh, so I've lost my reason to be Queen But Walter Raleigh has fallen in love with a lady-in-waiting, and she's about to start a war Had to decide if she should be Queen or want something else...

I told you this story, there are gods and there are two humans.

Felipe II always prayed and was holy, Elizabeth was holy, but not so much, because she considered herself holy, and in her was the blood of the mortal.

Sanctity is unfair, the gods said, "Okay, let's save the righteous."

they saved the righteous

The gods sent Walter Raleigh to separate Elizabeth's mortal body from her mind.

The mortal body is the girl who fell in love with Walter Raleigh, who gradually estranged from Elizabeth, so that she could attain sanctity.

Two holy men fought, the gods weighed their holiness

Of course British public opinion was angry

You said, "We won the Battle of the Armada."

If you ask me, it was the storm that destroyed the Armada.

the gods brought the storm

do you know what i was doing

I was looking for a mythical reason to make a movie.

When I asked Cate Blanchett, "What movie is this?"

I said, "It's a movie about a woman trying to come to terms with aging."

the psychological answer

The screenwriter says it's a movie about history and trickery.

For me, it's a movie about myths and gods.

I'm going to show you a scene from the film, notice the camerawork, where Elizabeth is in the depths of her mortal destiny.

She discovers the true meaning of death and what would happen if she were mortal.

Recognize the danger of mortality and understand why it should be eliminated.

Look, to me, Elizabeth and my lady-in-waiting Beth are part of the same physical body, one mortal self and one spiritual self.

let's see

(music) Elizabeth: Beth?

where is beth

Beth Throckmorton?

Beth: Yes here Mistress

Elizabeth: Tell me is it true?

are you confined?

Have you had a child?

Beth: yes mistress

Elizabeth: You traitor

why were you hiding that?

Don't you need my permission to fall in love and have children?

This bitch wears my clothes

are you listening?

Walsingham: Your Majesty, have dignity and mercy.

Elizabeth: This is not the time to say mercy

Lord go to your traitorous brother

Is it his child?

Tell me, are you his child?

Beth: yes

Mistress is my husband's child

Elizabeth: Bitches! (shouting) Laurie: Your Majesty.

this is not the queen i love and serve

Elizabeth: She seduced my handmaiden and married her without royal permission.

It's against the law. Arrest him.

go

I won't protect you anymore

Beth: As you wish, Your Majesty.

Elizabeth: Go, vanish!

go away

(music) Kapoor: Do you know what I'm trying to do here?

Elizabeth sees it all and faces her own jealousy, her own mortality.

Look at architecture

the building tells a story

Even if Elizabeth was the most powerful person in the world at the time, there is something else, and architecture is much bigger than her.

The stones are natural, and they're huge.

will outlive her

So the stone is depicted as part of her destiny.

Also, the camera is composing looking down on

because she is in the well

We are in the well of finite life

she has to get out of there and free her mind

That's when Elizabeth and Beth become one.

But it's also the moment Elizabeth physically separates from Beth.

The film portrays the scene in multiple layers.

We tell stories through layers of video, music, and actors, and each layer has a different hue and sometimes clashes with each other.

Let me tell you how I got started with this style of photography.

What is the storytelling process?

About 10 years ago, I heard a story from a politician who is not very respected in India.

He said people in cities flush more water into their toilets at one time than people in the countryside can sustain for two days.

And it clicked and I said, "That's right."

When I visited a friend, he made me wait at his apartment in Malabar Hill, on the 21st floor in Mumbai's ultra-luxury area.

he was in the shower for 20 minutes

Bored, I left and drove through the slums of Bombay, as I always do, and I saw a long line of women with children under the scorching sun, waiting with buckets to get water from a water tanker.

An idea was born from that

How does it become a story?

I suddenly realized that mankind was headed for disaster.

My next work is called "Paani" which means water.

We're just starting to make a world out of the myth of water.

What kind of world did you create and where did the ideas and designs come from?

I think there will be flyovers in the future.

A flyover is

It's going to fly through the sky to get from point A to point B faster, but it's going to be an efficient way to get between wealthy places.

What emerges from here is a city connected in the air.

The rich go to the upper cities, the poor are left in the lower cities, and about 10 to 12 percent of the people go to the upper cities.

Upper and lower cities have origins

In Indian mythology, it says in Hindi, [Hindi] Do you know what it means?

The rich always live on the shoulders of the poor.

Out of that myth came the upper and lower cities

design tells a story

What's happening now is that people in the upper cities are sucking up all the water.

That's what I'm sucking up

It sucks up all the water and uses it for its own sake, and only drips into the lower cities.

If there is a revolution, they will cut off the water supply.

Democracy still exists, so the democratic way is to say, if you give us what we want, we'll water it.

It's about time

But let me tell you this, what I'm doing with film is how to develop the story, how to talk about the connection between the story and ourselves, and how to translate that into the grammar of film.

But in the end it contradicts the story.

everything contradicts

the universe is a contradiction

And we always look for harmony

When you wake up, night and day are contradictory

But if I wake up at four in the morning

Where the dark sky first blushes is where night and day find harmony.

Even if the harmony itself doesn't appear in Mozart's score, for some reason

Every contradiction in his music feels like it's heading towards harmony.

That's what poets and storytellers do when they search for harmony in the contradictions that exist in their minds.

The narrator of the story has an ethical contradiction in his mind.

In the mind of a poet there is a clash of words In the mind of the universe there is a conflict of day and night

In the minds of men and women, there is always the contradiction between man and woman, and we try to find harmony in that.

That's what contradiction is, but embracing contradiction is telling a story, not solving a problem.

The problem with stories told in Hollywood and many movies is that they try to resolve contradictions.

harmony is not a solution

Harmony implies much more than resolution.

Harmony implies something that is all-encompassing, universal, eternal, and of the moment.

the solution is much more limited

Finite solutions, infinite harmony

Storytelling, like all other contradictions in the universe, seeks harmony and eternity, with a determined ethic to decide which contradictions to resolve and which contradictions to leave untouched, and to create those contradictions that really matter.

thank you very much

(applause)

Today I want to talk about the relationship between science and values.

The general public thinks that questions of morality, such as right and wrong, are outside the scope of science.

While science helps us in our lives, it's believed that science can't explain what we should respect.

As a result, it's easy to think that science can't answer some of the most important questions in human life, like what it means to live.

something worth dying for

things that make up a meaningful life, etc.

My point is that the gap between science and human values ​​is a delusion, and that delusion is very dangerous in today's world.

Science is said to be incapable of providing a basis for morals and values ​​because science is a field of facts, and facts and values ​​do not seem to belong in the same field.

People tend to think that there is no description that mentions what the world should be like.

I do not think so

values ​​are a kind of fact

Facts about the healthy life of conscious creatures

We don't treat stones with compassion

stone feels no pain

Because I think the reason I think primates are more important than insects is because I think the happiness and pain that primates will go through is greater.

What's really important here is that this is an assertion, and it may be true, but if our interpretation of the relationship between life's complexity and life experience is wrong, then we probably didn't understand the inner life of insects.

As far as I know, anything that talks about morality or human values ​​is related to human consciousness and changes in consciousness.

Even if we derive our values ​​from religion, and think that good and evil deeds, like eternal happiness or hellish torment, will affect us after death, we still care about what we are conscious of and the changes that accompany it.

To say that such changes continue after death is itself an assertion, which of course may or may not be true.

When we think about healthy living in this world, it's a fact that there are different scales.

You can live in a failed state, a place where everything goes wrong, where mothers can't feed their children, where strangers can't find a platform to cooperate, and where random killings happen.

It's true that we can live in more peaceful conditions, and giving lectures like this is an example of that.

What we do know is what's right and what's wrong under those circumstances.

Is it a good idea to mix Vibrio cholerae with water?

you can't say

When bad things happen to you, it's not a good idea to believe in the evil eye and blame others.

For human society to thrive, there are facts you must know, whether you understand it or not.

morality is related to this fact

So when we talk about values, we're talking about facts.

We can perceive our existence on many levels, from the level of the genome, to the level of our economic system, to the level of our political agreements.

But when it comes to healthy living, the human brain is inseparable.

Because what we experience in this world is what happens in our brains, regardless of what happens after we die.

Even if a suicide bomber gets 72 virgins in heaven, the disappointing character the suicide bomber gets on earth is a product of his brain.

The contribution of culture is to change our brains.

So no matter what cultures think about human well-being, it can be understood from more commonly understood sciences like neuroscience and psychology.

What I'm arguing is that values ​​can be drilled down into the conscious experiences of conscious creatures.

The various changes experienced by conscious creatures can be envisioned as spaces.

I see this as a moral landscape, and I liken the individual or collective sense of well-being to the undulations of the landscape.

It should be noted that there is a state of human well-being that most people do not reach.

unseen state

Some of those states could be called mystical or spiritual.

Maybe it's inaccessible because of the way the mind is structured, but it might become accessible.

I'm not saying that science can map this space or that every moral question can be answered with science.

I don't think supercomputers will ever be able to answer questions like whether we should have a second child or whether we should blow up Iran's nuclear facilities.

(audience laughter) But if it affects human well-being, there is an answer to the problem, whether we can figure it out or not.

Admitting that there are right and wrong answers to the question of human prosperity will change the way we talk about morality and change our outlook on how humans will work together in the future.

For example, 21 states in the United States have legalized corporal punishment in class, so it's not a problem for a teacher to hit a student with a wooden stick and bruise and blister them.

Countless students suffer from this every year.

You wouldn't be surprised to hear where the "state of knowledge" is located.

It's not Connecticut

The reason for accepting corporal punishment is clearly a religious background.

The Creator God said, "If you spare the whip, you will spoil the child." I think it was written in the 13th, 20th and 23rd chapters of the Old Testament.

Generally speaking, is it okay to use violence and shaming children in the name of disciplining them to facilitate their emotional development?

(audience laughter) Who thinks this question has no answer? Who doesn't care?

Many people think that the concept of peace and security is so vague that everyone disagrees.

So how can we define the concept of security?

Think about the concept of physical health

physical health is not defined

As Mr. Spector put it, the concept has changed over the years.

When this statue was carved, the average life expectancy would have been about 30.

In developed countries, it is now around 80 years old.

One day, if I were genetically engineered, it would be considered a stumbling block to not be able to run a marathon at age 200.

Donations may be sent

(Audience: laughter) Just because the concept of health is ambiguous doesn't mean that the concept of health is meaningless.

The distinction between the healthy and the dead is as clear and significant as any distinction made by science.

There may be many peaks in the moral landscape that signify security, although there may be more than one way to organize human societies to maximize human prosperity.

Why doesn't this undermine objective morality?

Let's take food as an example.

There are many foods that make up a healthy diet.

It's easy to distinguish between food and poison.

Many answers to the question of what food is

Just because you can think of it, doesn't mean there aren't facts about nutrition to know.

Many people worry that universal morality must be moral precepts without exception.

If lying is bad then lying must always be bad If there are exceptions then there is no such thing as moral truth

Why do you think this way?

think chess

The trick to winning is not to get the queen, but the queen

by being taken

It is true that it can be beneficial

Sometimes the only move that isn't a disadvantage is getting the queen taken.

But chess is a field of objectivity

Even if there are exceptions here, it's still an area of ​​objectivity.

This has to do with what we're likely to do in the realm of morality.

Take, for example, the way we treat women's bodies.

One way is to cover the whole body

In general, it may not hold up among us intellectuals, and it may be construed as wrong in the secular regions of America.Are we qualified to argue that it was wrong for the inhabitants of a venerable ancient culture to have their wives and daughters live in burlap sacks, if they refused to be kept under wraps?

Do we have what it takes to argue that it's wrong to hit you with a wire rope or pour sulfuric acid in your face?

Are we not qualified to claim

I don't know about human well-being, so I pretend not to take personal judgments on such customs - do we have what it takes?

I didn't mention wearing the veil at will

I think you should wear it, but what does voluntary mean in a society where fathers impulsively kill their daughters because they've been dishonored when they're raped?

Think about how shocking it is, when my daughter is raped, all I want is to kill her.

Could this mark the peak of human prosperity?

I'm not saying that our own society has the perfect solution.

For example, in a civilized country, magazines like this are not uncommon.

A man with a degree in philosophy might take issue with such depictions.

(audience laughter) But when you think about it introspectively, are these depictions the right way to represent youth and beauty and the female body?

Are these images suitable for raising children?

Maybe I can't say, I think you could say that there's a nice balance between these two extremes of imagery.

(Applause) Perhaps there are many such places, and given other changes in human culture, there may be many peaks in the moral landscape.

But we should be aware that there are many more places besides the peak.

The irony, I think, is that it's only certain religious leaders who generally agree with me and think there are right and wrong answers to morality questions.

They take it for granted that moral questions have correct answers because they have heard voices from heaven, not because they have intelligently analyzed the circumstances and motivations for the well-being of humans and animals.

Most of us get our moral answers from religious teachings, which keeps us from paying attention to the real suffering of humans and animals.

That's why we talk about gay marriage and not about big issues like genocide, nuclear proliferation, poverty.

But what the religious leaders are right about is that we need a universal conception of human values.

that it does not exist

Because everyone does different things when it comes to morality, especially secular, academic, and scientist types.

Morality respects differences of opinion in a way that other topics don't.

Every morning, the Dalai Lama meditates on compassion, saying that helping others is essential to human happiness.

And then there are people like Ted Bundy, who was a pervert, a serial killer.

You could say that we all have different opinions on how to use our time wisely.

(audience laughter) A Western intellectual would say that if these two men were to argue, neither the Dalai Lama nor Ted Bundy could say who was right or who was wrong, because their claims were not based on scientific evidence.

like a matter of taste

I would also say that there shouldn't be a single reason to convince others.

If the subject is within the realm of science, it won't be.

Edward Witten on the left

I'm a theoretical physicist

If you ask any smart physicist who is the smartest physicist, half of them, in my experience, say Witten.

The other half will say the question is silly

(Audience: Laughter) Suppose I said at a physics conference, "String theory is bullshit.

I don't think this explains what the universe looks like.

Unsupportable”

(audience laughter) I don't think anything will happen when I say this.

String theory version of Ted Bundy

(audience laughter) I can't trust any string theory club to have me as a member.

but this is the point

Not all opinions should be considered when discussing facts.

That's why we have experts

Savvy opinion counts

How did we become convinced that there were no moral experts or geniuses within the realm of morality?

How did you know that every opinion counts?

How do you know that every culture has a point of view on a topic like this that deserves attention?

There's no way the Taliban have any notable views on physics.

(audience laughter) Isn't it obvious that the Taliban are ignorant of human well-being?

(Applause) So what the world needs now is

It takes people like us to admit that there are right and wrong answers to the question of human prosperity.

Individuals and whole cultures can honor what's wrong, that is, individuals and whole cultures can have beliefs and desires that cause them unnecessary suffering.

Just recognizing this will transform the way we talk about morality.

Boundaries between nations are becoming less meaningful than they used to be, and one day they will become irrelevant.

You can't smother destructive technology that's already been made. It's always easier to destroy things than to repair them.

What we can clearly see is that we can no longer respect or tolerate the huge gaps in human well-being than we can tolerate the big gaps in how we think about the spread of disease, the safety standards of buildings, and so on.

We need to unify how we answer the most important questions in human life.

To do that, we have to admit that questions like this have answers.

Thank you very much

(Applause) There was something about this that made me angry.

Some of the people listening to this talk are probably cursing in anger.

I was worried about the way you worded it

When you talked about the veil, you used the example of a woman wrapped in a jute bag.

I have lived in the Islamic world and have spoken to many Muslim women.

Do they have different views? For example, wouldn't you say that covering your skin is a way to celebrate being a woman, a way to deal with lustful men? That's an educated psychological point of view.

Is it possible to have a dialogue with women who make such comments without being biased towards cultural imperialism?

Yes, I was trying to make a point, mindful of how much time was left, but the question is, what does voluntary mean where we're forcing women to wear the veil?

So if you guys here want to wear veils and crazy hats and get tattoos on your face, you should do what you want, but we have to admit that women like this are constrained.

So you shouldn't necessarily rely on their opinion, especially when it's 48 degrees and you're covering your whole body.

A lot of people want morals to improve.

can it be adjusted

Your view was that by not making the world one-dimensional, it would be harmonized.

What do you want your world to look like when you shift your vision 50 or 100 years into the future, with a variety of behavioral patterns and a moral uplift?

If we admit that we're moving towards understanding the human mind at the brain level, we have to admit that we're going to understand our own positive or negative endowments from a physiological perspective.

It's about understanding positive social emotions, like empathy and compassion, and understanding what drives them, whether it's genetics, or the way people approach each other, or the economic system.

You should get objective certainty

It's not the kind of thing that equates veiling a daughter from birth with raising her to be an educated and confident woman, but in the context of the man who wants a woman.

You don't have to do research to come to the conclusion that compulsory veil wearing is bad, but one day we'll be able to scan the human brain and figure it out.

For example, if we look at the degree of love that people with these habits have for their daughters,

I think the answer is clear

If they respond that you love them, are you prepared to change your current intuitive opinion that you touched on in your talk?

Of course, if you have misguided beliefs

You could say, "Because of your compassion, I cut off my gay son's head so he wouldn't have to go to hell."

If each and every one of those actions puts them in the correct relationship position, then I think they are feeling love.

But, as I said earlier, we have to talk broadly about compassion.

It's something everyone should be involved in, not a man in a trance blowing himself up on a bus.

I would love to continue the conversation, but I don't have time.

thank you for this time

thank you

(applause)

Wildlife trafficking in Brazil is one of the most serious threats to fauna, especially birds. Mainly supply to the pet market. Thousands of animals are taken from their natural habitat every month and sold mainly in São Paulo and Rio de Janeiro.

The various illegal wildlife trades in Brazil are said to remove some 38 million animals from the wild each year, with a commercial value of as much as $20 billion.

Police are intercepting huge cargoes of live animals that go to the pet market, or seizing animals directly from homes. This results in the seizure of thousands of animals each month.

Follow "Brad" to understand what happens next.

When animals are protected, many people think, "Well done! Justice has been served!

We rescued lovely, mistreated animals from the clutches of evil traffickers, and they all lived happily ever after."

Is that true? Not really. Many problems start here.

Because we need to think about what to do with these animals.

In Brazil, they are generally sent first to a national triage agency. The environment is as bad as poachers.

In 2002, triage agencies received 45,000 animals, of which 37,000 were birds.

Police estimate that only about 5% of those poached are rescued.

Lucky animals, including "Brad", go to a full-scale rehab facility after triage.

You will get paid there.

I will teach you how to fly. You will also learn how to find food in nature. And you will be able to associate with people of the same race.

(Laughter) But then?

I will look only at birds. The Brazilian Institute of Ornithology claims that we know too little about wildlife.

Releasing animals into the wild therefore entails a great deal of risk for protected animals and animals in the wild.

In addition, they argue that too many resources are being spent on rehabilitation.

During this discussion, I propose that protected bird species that are not endangered should be euthanized.

But that would mean that São Paulo alone killed 26,267 birds in 2006.

But some researchers, myself included, some nonprofits, some people in the Brazilian government, believe there are other ways.

We believe that we can responsibly release animals that meet our criteria for health, behavior, inferred habitat and, to the best of our knowledge, natural populations. It's also for the animals themselves, for the protection of their species, and for the ecosystem. Because we're attributing genes to nature that will play an important role in tackling environmental change. They may also release seed distributors, predators, and prey.

It's an animal we set free.

At the top, sea turtles enjoy their freedom.

(Laughter) The bird in the middle photo nested a few weeks after it was released.

The bottom one is my favourite, the released male reunited with the wild female after 4 hours.

So this is not a new initiative, it is already being implemented around the world.

But in Brazil it is still a serious problem.

We believe that we have done a responsible release.

There are records of animals released into the wild mating and producing offspring.

In other words, these genes are surely returned to nature.

However, due to a lack of knowledge, they are few.

Let's do more research and shed more light on this issue. Do what you can.

I am fully dedicated to this job.

I call on all of you here to do what you can. Talk to your neighbors, educate your kids, buy pets from legitimate breeders.

We need action! We need it now. before they perish.

Thank you for your attention.

(applause)

First, leaders and officials often write incomprehensible documents, and such texts are so complex that 40,000 pages of regulations are nothing but pain.

For veterans of Iraq and Vietnam, applying for grants is a mountain of paperwork.

What can you do? Simplicity is clear, transparent, empathetic, and allows for human communication.

I've been keeping my writing "simplistic" for 30 years.

Coming from advertising and design business

I'm interested in understanding people, whether it's how they interact with bureaucrats to apply for grants, how they interact with companies to build business relationships, or branding.

If President Obama said, "Why aren't credit card contracts written in simple English?"

I locked myself in my room, figured out what was going on, got the paperwork together, and rewrote it in plain English.

We asked one of Japan's leading consumer finance lawyers to correct this

this is the real thing

So I took it one step further and said, "Why do we have to stick to formal lawyers and paper? Use the computer."

Some people find math difficult

So, I worked with Harvard Business School to explain the minimum payment: For example, if you spend $62 on food and pay later, the minimum payment increases to $99.17.

how is it? Will the bank explain this?

It's much easier and more effective than just a calculator.

And what about the term "expired"?

probably hard to understand

You can only judge by the context

By replacing these with simple English words, you can force yourself to compromise on a way out of your own risk.

In plain English, it means to change the content.

What I'm most proud of is this agreement with IBM.

it's a calendar

This day is IBM's responsibility Another day is your responsibility

Very useful in business

I have something to tell you today.

1 in 10 taxpayers receive a letter from the US IRS each year

200 million in total

A "simplistic" reading of such a notice would have been difficult to understand.

All the red marks are difficult parts

More than 1,000 in total Attempted to “simplify” the text of 70% of the transactions of the Regional Taxation Bureau

challenged in the laboratory

As you can see, the red spots have decreased dramatically from what I've seen.

The IRS now uses

(Applause) So there's an effort going on that I want you to pay attention to.

There's been a lot of discussion with the Consumer Financial Protection Agency on how to mandate "simplicity."

As you can see, it's too complicated

It is our mission and that of this agency to make clarity, transparency and empathy a national priority.

We don't have to let the bureaucratic style of government run wild.

We don't need to do business with companies who present us with documents we don't understand.

So how can we change that?

clarity transparency simplicity

thank you

(applause)

4.6 billion years of history in 18 minutes.

300 million years per minute

Let's start with NASA's first photo of Mars

This is Mariner 4 in 1965.

Taken while flying

When this picture was released, that famous scientific journal, the New York Times, wrote an editorial, "Mars is not fun.

The world of death, NASA should spend no more time and effort studying Mars."

Luckily, the leaders at NASA headquarters in Washington were more sensible people, and that's how the massive survey of this red star began.

One of the key questions in all science is, "Is there life outside of Earth?"

I think Mars is the most likely place to have life outside of Earth.

Later on, I'll show you some surprising findings that suggest there may be life on Mars.

But first, let me tell you about a photo taken by the Viking.

This is a composite of photos taken by the Viking in 1976.

Viking was developed and operated at NASA's Langley Research Center.

We sent two orbiters and a lander in 1976.

Of the four space probes, two have orbited Mars and two have landed on the surface, which was a great achievement.

This is the first photograph taken on the surface of an extraterrestrial planet.

This is a picture of the surface of Mars taken by the Viking lander.

Mars is indeed red

Mars is half the size of Earth, but two-thirds of the planet is covered in water, so the land area of ​​Mars is about the same as the land area of ​​Earth.

It's half the size of the Earth, but it's a very large place.

We've surveyed the geography of the surface of Mars, and we know the elevation differences.

I learned a lot about Mars

Mars has the largest volcano in the solar system, Mount Olympus.

Mars also has the Grand Canyon of our solar system, Valles Marineris.

very interesting planet

Mars also has the remains of the largest impact crater in the solar system, the Hellas Basin.

3,200 kilometers in diameter

If you were there when this impactor hit Mars, it would have been a really bad day.

(Laughter) This is Mount Olympus.

It's bigger than Arizona

Volcanoes are important because they create the atmosphere and the oceans.

What you're looking at now is Valles Marineris, the largest canyon in the solar system. It's 4,800 kilometers long.

It's one of the most interesting features of Mars, according to the National Academy of Sciences, and one of the top 10 mysteries of the space age is why some regions of Mars are so strongly magnetic.

called crustal magnetism

There are places on Mars that for some reason we don't know today have a very strong surface magnetism.

Is there water on Mars?

No, there is no liquid water on the surface of Mars today.

But there is some interesting evidence to suggest that ancient Mars may have had rivers and rushing water.

Mars is very dry now

We think there is some water in the polar caps, the polar caps at the north and south poles.

A recent image

From Spirit and Opportunity

It shows that there was once a very fast stream of water on the surface of Mars.

Why is water important? Because life needs water

Water is the key substance for the birth and evolution of life on planets.

Here's a picture of Antarctica and Mount Olympus.

So this is frozen water

ice water on Mars

This is my favorite photo taken just a few weeks ago.

not yet published

This is a Mars Express image taken by the European Space Agency of Mars in craters and inside craters, with liquid water and ice.

very interesting photo

We think that in the early days of Mars, 4.6 billion years ago, Mars was very similar to Earth.

Mars had rivers and lakes, but more importantly, it had planetary-scale oceans.

We believe that the ocean was in the northern hemisphere, and this blue area shows a depression about six kilometers long, which was once an ocean on the surface of Mars.

Where did all the water on Mars—enough to form the oceans—go?

i think it's like this

These are the measurements sent back several years ago from the moon Odyssey orbiting Mars.

There is water under the surface of Mars, which exists as frozen ice.

This is a percentage, so if it's a bluish color, it's 16% by weight.

16% of the interior by weight is frozen water or ice.

There is a lot of water under the surface

What I find to be the most interesting and mysterious survey of Mars was published earlier this year in the journal Science.

What we're looking at now is the presence of methane gas, or CH4, in the atmosphere of Mars.

You can see the methane in three regions.

Why is methane important?

Because 99.9 percent of all methane on Earth is produced by living organisms, not by little green people, but by microorganisms in the ground or on the ground.

There is now evidence that the atmosphere of Mars contains methane, which on Earth originates from organic matter, which is produced by living organisms.

There are three regions, A, B1 and B2.

This is where you see methane eruptions, and geological studies show that this is the oldest region on Mars.

In fact, both Earth and Mars are 4.6 billion years old.

The oldest rocks on Earth are only 3.6 billion years old

Our geological understanding is that the billion-year gap is due to plate tectonics, the Earth's crust is in cycles.

We don't have a geological record that goes back to the first billion years.

The record remains on Mars

The region we're looking at dates back to 4.6 billion years ago, when Earth and Mars formed.

it was tuesday

(Laughter) This map shows where we sent our lander to the surface of Mars.

Viking 1 and 2

Opportunity and Spirit

And Mars Pathfinder and Phoenix, which just landed two years ago.

All of our ground probes and landers went to the northern hemisphere.

Because the northern hemisphere is the region that was the ancient ocean basin.

not many craters

Because water protected the ocean basins from asteroid and meteorite impacts.

look at the southern hemisphere

The southern hemisphere has impact craters and volcanic craters.

It's the Hellas Basin, a very different place geologically.

Methane is in a very bumpy area.

What's the best way to unlock the mysteries that exist on Mars?

I asked this question 10 years ago

We invited 10 of the best Mars researchers to Langley Labs for two days.

Take up big unanswered questions on the spot

We spent two days discussing how we could answer this question.

The result of the meeting was a rocket-powered robotic plane called ARES.

It's an airplane that surveys the environment from the air at the regional level.

This is a model of ARES

one-fifth the size

This plane was designed at Langley Laboratories

If there's a place where you can build a plane to fly to Mars, it's the Langley Lab, which has been the world leader in aviation for almost 100 years.

Fly 1.6 kilometers above the surface of the earth

It can fly hundreds of miles at about 720 kilometers per hour.

It allows us to do things that surface probes and landers can't: we can fly over mountains, volcanoes, impact craters and valleys, we can fly over magnetic fields, polar caps and watery surfaces, and we can search for life on Mars.

But just as important is the transmission of that record as it flies through the atmosphere of Mars, sending the images of the first extraterrestrial flight to Earth.

We want to lift the spirits of the American people who support this mission through our tax dollars.

And more importantly, to inspire the next generation of scientists, technologists, engineers, mathematicians.

Well-educated next generations of scientists, engineers, mathematicians and technologists are extremely important for our national security and for our economy.

Here's what ARES looks like as it flies over Mars.

pre-program

fly where there is methane

We're going to take a sample of the Martian atmosphere every three minutes with a device on board an airplane.

Along with methane, we look for other gases produced by living organisms.

We can figure out where these gases are coming out, and we can measure the tilt of that spot, so we can do the next mission to land there.

How do you get a plane to Mars?

Simply put, "very careful"

Instead of flying it to Mars, put it in a spaceship and send it to Mars.

The problem is that the spacecraft has a maximum diameter of 2.7 meters, and ARES has a wing length of 6.4 meters and a length of 5.2 meters.

How do we send it to Mars?

Fold it up and carry it on a spaceship.

put in a protective shell called an aeroshell

do it like this

There is also a video explaining the sequence of events.

Video: 5,4,3,2,1

Main engine start firing

JL: It's a launch at the Kennedy Space Center in Florida.

It will take nine months for this spacecraft to reach Mars.

enter the atmosphere of Mars

It's a lot of heat, it's frictional heat.

Parachutes open to slow you down

Cut off heat-resistant tiles

Airplane exposed to the atmosphere for the first time

The folded part expands

rocket engine ignites

In an hour's flight, we should be able to rewrite the textbooks on Mars by taking precise measurements of the atmosphere, looking for biogenic and volcanic gases, studying the surface and surface magnetism, which we don't know yet, and exploring other regions.

Careful preparation guarantees success

Why is success guaranteed?

It's because we've had several models of ARES that we've run in six wind tunnels at NASA's Langley Research Center in Mars-like conditions for eight years.

Just as importantly, we're testing ARES in an atmosphere 30,000 meters above Earth, similar in density and pressure to the atmosphere in which it's going to fly on Mars.

It's 30,000 meters, and if you fly across America to Los Angeles, you're flying 11,000 meters.

Our test flight is at an altitude of 30,000 meters

Let me show you what the test flight looks like

It's a half model

This is a high altitude helium balloon

Over Tillamook, Oregon

We put the folded plane into the balloon. It takes about three hours to ascend. Then at 30,000 meters, we give the command to release the plane. We deploy the wings and everything goes well.

To perfect this technology, we conducted high-altitude and low-altitude tests.

ready to go to mars

Here is a scale model

NASA's Langley Research Center has a full-scale model.

I'm ready. All I need is a check from NASA headquarters. (Laughter) It costs money.

I will donate my money for today's talk to this mission.

I don't really thank you

This is the team at ARES, about 150 scientists and engineers at the Jet Propulsion Laboratory, the Goddard Space Flight Center, the Ames Research Institute, along with six major universities and companies.

A big effort is underway at NASA's Langley Research Center.

And finally, not far from here, in Kitty Hawk, North Carolina, history was made just over 100 years ago when the first powered airplane took off.

We are about to make the first flight in an airplane outside the Earth's atmosphere.

I'm ready to fly this plane to Mars and rewrite textbooks.

If you want to know more, we have a website that explains this exciting and interesting mission and why we want to do it.

thank you very much

(applause)

One day, LA Times columnist Steve Lopez was walking down downtown Los Angeles when he heard a beautiful tune.

The owner of the sound was an African-American man, a nice, rugged, homeless man, and he was playing a violin with only two strings.

I'm sure many of you are familiar with this story, because Steve's column was turned into a book and then into a movie. Robert Downey Jr. played Steve and Jamie Foxx played Nathaniel Ayers.

I dropped out of Juilliard, went bankrupt, and 30 years later, I was homeless in the Skid Row neighborhood of downtown Los Angeles.

I urge you to read Steve's book or watch the movie to find out how the bond was formed between the two, how music helped create that bond, and how he ultimately rescued Nathaniel from a life on the streets.

I met him two years ago at Walt Disney Hall.

After hearing Beethoven's 1st and 4th symphonies, he came backstage.

He was very lively and social, talking about Yo-Yo Ma, Hillary Clinton, and how the Dodgers wouldn't win the World Series...all because the whimsical violin line of Beethoven's Fourth Symphony was to his effect.

A few days later, I got an email from Steve saying that Nathaniel wanted to take violin lessons from me.

One thing I can tell you is that he refused to be treated. When he was previously treated, it involved shock therapy, thorazine, and handcuffs, and left the wounds with him for the rest of his life.

So he was prone to bouts of schizophrenia. When the worst of it happened, he would explode and then disappear for days, wandering the streets of Skid Row, in constant terror, and the pain in his heart would come right out.

When we started our first lesson at Disney Hall, he was in such a state of excitement, his eyes glowing unnaturally, he lost his mind.

They were talking about invisible demons and smoke and being poisoned in their sleep.

I was afraid, it wasn't about me. I was afraid I might lose him. His condition was getting worse, and I thought that if I started teaching scales and arpeggios and all that kind of preachy-style teaching there, I'd probably ruin his relationship with the violin.

(Laughter) So I decided to start playing right away.

I played the first movement of Beethoven's Violin Concerto.

As I played, I could see a distinct change in Nathaniel's eyes.

It was as if the music I was playing triggered some kind of invisible drug-like chemistry.

Nathaniel's morbid rage was replaced by understanding, subdued curiosity, and grace.

And then, miraculously, he picked up his violin and began playing fragments of violin concertos that he remembered, and asked me to fix them: Mendelssohn, Tchaikovsky, Sibelius.

And then we talked about music: Bach, Beethoven, Brahms, Bruckner, Bartók, Esa-Pekka Salonen, all composers starting with B.

I found that not only did he have an encyclopedic knowledge of music, but he was deeply connected to it on a personal level.

He speaks music with passion and understanding, no different than what I share with my fellow orchestra members.

And as he played music and talked about music, he was a different person, from a paranoid psychotic fresh off the streets of downtown LA to a charming, well-versed, Julliard-educated, brilliant musician.

music is medicine music changes us

Nathaniel has something to bring back the heart.

Music takes his thoughts and delusions and brings them to life through imagination and creativity.

that frees him from his torment

I believe that this is the essence of art

That's why we make music. We take something very basic in all of us, the emotion, and transform that emotion into reality through the lens of art, through creativity.

And the reality of that expression reaches us all, moves us, inspires us, and brings us together.

For Nathaniel, music also brings him back to his friends.

The saving power of music brought him back to a fellow musician who understood him, recognized his talent, and respected him.

I'll always play music with Nathaniel Whether it's Disney Hall or Skid Row Because he reminds me why I became a musician.

thank you very much

(Applause) Thank you very much.

It was Robert Gupta

(Applause) I'm going to play a piece I shamelessly stole from cellists.

please forgive me

(laughter) (music) (applause)

My interest in modern slavery was sparked by a leaflet I picked up in London.

At a public event I attended in the early '90s.

The leaflet read, "There are many slaves in the world today."

I thought, "It can't be that way."

i was puffed up

Because honestly, I thought, how can a young, on-the-job human rights professor not know?

so it can't be

Those who are teachers and worshipers of learning should not mock the god of learning, for the god of learning has endowed you with curiosity and aspiration, and with that passion will guide you on the path of change.

A search of the literature turned up 3,000 documents about slavery.

Two were about modern slavery, only two.

the rest were all historical accounts

Those reports were full of emotion, full of speculation and anecdotes, and lacking in truth.

So I started my own research project.

visited 5 countries

I've seen slaves, I've met slave owners, and I've studied the slave business deeply, because slavery is an economic crime.

It's not the purpose of people to torture people

to enslave for profit

What I saw was the same sad reality wherever I went on four continents.

It's like this, on farms in Africa, we've seen slaves flogged and beaten as they escaped from our film crews.

I was stunned

I want to be clear here

This is a real-life slave story

It's not about a broken marriage, it's not about a boring job.

This is the story of the people who cannot escape, the people who are forced to work for no pay, the people who are forced to work for free in constant fear of violence.

Modern slavery is no different than slavery in the past.

In which areas are there many?

The red and yellow areas on this map are the areas with the highest slave density.

This blue area is a country where there are no slaves at all.

As you can see, only Iceland and Greenland, as you can see, only Iceland and Greenland have no slaves at all.

And we're particularly interested in areas where slavery has caused severe environmental destruction.

All over the world, slavery is causing environmental destruction, from deforestation in the Amazon rainforest to deforestation in West Africa, to mining and the spread of mercury pollution in Ghana and Congo, to the destruction of coastal areas in South Asia.

There is a tragic correlation between the ongoing environmental problems and human rights abuses.

How did this happen? As of 2010, 27 million people were enslaved.

That's double the number of people who were deported from Africa during the transatlantic slave trade era.

there are several factors

There are factors that are related, not coincidental

One is the well-known population explosion, which has grown from 2 billion people to 7 billion people in the last 50 years.

You don't become a slave because there are too many people

So many people in developing countries are vulnerable to civil wars, racial conflicts, dictatorships, epidemics, etc.

You know, in a country like Sierra Leone a few years ago, it all happened at the same time. There are about a billion people in the world who live on the edge of a cliff.

That doesn't make me a slave

The poorest and most vulnerable people become slaves because they lack the rule of law.

If we had the rule of law, we could protect the poor and the vulnerable.

But when corruption becomes rampant, the social security of the rule of law is gone, and violence begins to be used, and there is no punishment for violence, then the enslavement of the vulnerable begins.

This is what happened all over the world

On the other hand, for many people, the process of becoming a slave isn't about being kidnapped or being beaten in the head.

They became slaves because someone asked

It's the same trick I've heard anywhere in the world

Everybody said, "I'm at home, and someone comes into the village and they're yelling, 'I have a job, I need someone to work for me.' 'I have a job, I need someone to work for me.'"

They said, "He was kind of suspicious and I doubted him, but the kids were hungry.

I needed medicine

I had no choice but to earn money to support my precious family.”

They leave with a stranger in the back of a truck

After traveling the unknown distances, they find themselves in dirty, dangerous and humiliating workplaces.

You reluctantly go to work, and when you try to escape, the batine and the hammer are shaken off, and you realize you've become a slave.

The outcome of such slavery is almost identical to historical slavery.

But there is one surprising new fact about modern slavery, and that is that the human price has completely collapsed. What used to be expensive is now extremely cheap.

It's on the topic of economic news It's on the topic of economic news

I will show you a short video

As always, we'll bring you lively discussions on macroeconomics and commodity prices.

Today's guest is Michael O'Donoghue, Director of Commodities Markets.

And Mr. Brent Lawson, from a brokerage firm.

thank you

welcome brent

Which areas will you invest in this year?

So far, I have short positions in gasoline and oil, and I'm thinking of expanding my range a little.

we are very interested in human trafficking

If you look at the long-term charts, it's at an all-time low, but the global demand for slaves is strong.

I think it's a good scenario to invest in.

What about human trafficking? Interested?

Of course, what makes forced labor attractive is that it's an asset in constant supply.

Humans never run out, no other commodity can.

let me tell you one thing

Private equity is showing interest, and I think it's going to be an explosive growth market.

As always, Africans, Indians and especially South Americans and Eastern Europeans are on the buy list.

Interesting, Michael, so what do you recommend?

We recommend buy and hold We recommend buy and hold

No active trading required

There are many socially vulnerable people. I'm really looking forward to it.

Thank you very much to all the guests.

As you can see, this is a made-up story.

But it was fun to see your jaws down But it was fun to see your jaws down

I worked with MTV Europe to create this hoax, and I inserted it in between the music videos without any explanation, and I think it's funny.

This is reality

For 4,000 years, the human price averaged about $40,000 in today's money.

It is an asset purchase property

The population explosion is crossing the two lines.

The modern human price is about $90 worldwide.

In North America, it's a little more expensive.

In North America, a slave costs $3,000 to $8,000, but in India and Nepal, a human can have it for $5 to $10.

The point here is that people are no longer asset purchases, they're like styrofoam cups.

You buy it cheaply, you use it, you crump it up, and when you're done using it, you throw it away.

boys from nepal

They're quarry transport owned by slave owners.

There are no roads here, so we carry stones as heavy as our own weight on our backs across the Himalayas.

One of their mothers said, "We can't survive here, but we can't even die."

it's a terrible situation

If there's one bright spot, it's that besides these young boys who are still enslaved, there are other ex-slaves who are freeing themselves.

It's the return of Frederick Douglass.

Have you ever daydreamed? What if you met Harriet Tubman?

What if you could meet Frederick Douglass?

The best thing about this job is that you get to meet people like that, and here's one of them.

His name is James Kofi Annan. He was a fishing slave in Ghana. He's now starting a new life after escaping from slavery, and he's working with an organization that helps free slaves.

This child is one who works with James.

He got hit in the head with a paddle.This reminds me of working here when I was little.

James and Emmanuel Otho, the head of Ghana, have received frequent death threats because they sued three people for human trafficking, resulting in their convictions and imprisonment.

I have to say that what I have told you so far is very sad.

But there's also a very bright side. Twenty-seven million people are still enslaved today. That's a huge number.

Similarly, the slave business generates $40 billion in annual economic output, but the economic impact of slave labor is the smallest percentage of the global economy.

Slavery is illegal in every country and has been marginalized in the international community.

In a way, without us even realizing it, slavery is on the brink of extinction, slavery is on the brink of extinction, and with one last push we can eliminate it entirely.

it is quite possible

So how much does it cost to emancipate slaves if you put all the resources into practice?

By the way, before we talk about costs, I want to clarify something.

We don't buy slaves for liberation

Buying slaves for emancipation is like paying a TV thief because it encourages crime.

Liberation still costs money.

Liberation and, more importantly, the work required after liberation.

It's a process, not an event

It's a process of regaining dignity, stability, economic autonomy and citizenship. It's a process of regaining dignity, stability, economic autonomy and citizenship.

And surprisingly, countries like India have very low costs. The three-generation family you see was hereditary slavery. The three-generation family you see was hereditary slavery.

Ghanaian fishery slave boys cost around $400 each

In the US, it costs more. Lawyers' fees. Medical expenses...

I understand. It's expensive here. It's about $30,000.

But most of the slaves in the world live in low-cost regions.

Global average cost is similar to Ghana Global average cost is similar to Ghana

Multiplying by the average costs, the total amount needed to free 27 million enslaved people and achieve sustainable freedom is about $10.8 billion -- the amount Americans spend on potato chips and pretzels, the amount Seattle invests in new streetcars, the annual amount of jeans purchased in the United States, and the amount spent on Game Boy iPods and other electronic devices during the holiday season -- about $10.8 billion.

Intel's Q4 revenue was also $10.8 billion

It's not a lot of money on a global scale.

it's an insignificant amount

And the great thing is, this money isn't disposable. There's a freedom dividend, and it's going to be very motivating when people who are freed from slavery start working freely.

He took his children to work, set up schools, and they said, "We've got three meals, medicine for when we're sick, and clothes for when we're cold."

They are both consumers and producers, and the local economy will grow rapidly.

How we build sustainable freedom is very important, because we don't want to repeat what happened in America in 1865.

4 million slaves were freed and abandoned

They were denied civil rights, a proper education, and the opportunities they needed to make a living, and instead were subjected to generations of violence, prejudice, and racism.

Emancipation of the slaves in 1865 failed, and America is still paying the price.

We made one pledge that we would never create second-class citizens after freeing our slaves.

should not be repeated

It's like true liberation

Ghanaian children freed from fishing slavery are reunited with their parents, and they go back to their villages with them to rebuild their financially healthy lives, never to be slaves again.

Now this woman lives in a mountain village in Nepal.

We worked in this village for about a month.

they had just been freed from hereditary slavery

Little by little, I could see the brightness in my life.

But when I talked to her and took this picture, there were still slave owners threatening us from the sidelines, and the slave owners hadn't changed.

we all got scared

I said to her, "Aren't you scared?

Aren't you upset?" She said, "No, now we have hope.

We can't fail anymore," he said, "because people are coming from the other side of the world to help us."

We must ask ourselves, are we willing to live in a world of slavery?

If we don't act, will we let the products we buy every day and government policies be entrapped with slavery?

If there's one thing that all of humanity can agree on, I think it's the complete abolition of slavery.

And if our human dignity is fundamentally violated, everyone will say it's evil and it's slavery.

And if we can't abolish slavery, what's the use of our combined knowledge, our political and our economic power, especially the combined knowledge power in this chamber?

I believe there is enough knowledge in this chamber to abolish slavery.

If we can't abolish slavery If we can't combine our knowledge, then there's one final question to ask: Are we really free?

I'm really thankful to you

(applause)

I am here today to tell you about my trajectory in the world of education and service that I have walked for the past six years.

Unless I'm a scientist

not even an experienced social worker

For 26 years in the corporate world, I've been trying to make organizations more profitable.

And in 2003, I started the Palikrama Charitable Foundation from a small desk.

I started by walking around the slums

But Bangalore has 800 slums and two million people.

we visited every slum we could go

Not in school - find a house with kids and talk to their parents

I persuaded my child to go to school.

Playing with the children, I was exhausted, and when I got home, I thought of the children's lively faces and twinkling eyes, and fell asleep.

We were all excited, but 200 million children aged 4 to 14 weren't in school, and the 100 million children who were in school weren't able to read or learn the basics of math.

Approximately 90% of the 250 billion rupees allocated for school education went to staff including teachers.

I hear it's being spent on paychecks.

And yet India's teacher absentee rate is among the highest in the world, with one in four teachers never coming to school in a year.

There's something very hard to understand. A lot of people have asked me, 'When are we going to start school?

How many schools will you open?

How do we determine the criteria?

How do we expand our school? ”

I'd be lying if I said I wasn't worried

But he said adamantly, "We don't care about numbers."

I want to make sure that one child at a time gets from grade school to college and prepares them for a better life and a better job.

That's how I started parikrama

The first school started in a slum where 70,000 people lived below the poverty line.

The first schoolhouse was on the roof of the only two-story building in the slum.

Of course, there was no ceiling, just a tin roof that was about as good as it felt.

This is the first school, 165 students.

new school year in india

It started in June, the rainy season, and every time it rained, we huddled under our roofs and waited for it to stop.

How much did that experience deepen our bond?

The friends I shared the experience with back then are still with me today.

The next school - the third, the fourth, and even the junior college.

In six years, we've established four schools and one college, with 1,100 children attending from 28 slums and four orphanages.

(Applause) The goal is pretty simple: to help prepare every single child for the rest of their lives, for their education, so that they can live peacefully in this troubled and chaotic world.

To appear in this international community, you must speak English.

So in all our schools, all classes are taught in English.

However, children from slums have never spoken English in their family or generation.

I can't speak English well

There is a superstition that

big mistake

I like exciting books My favorites are Hitchcock and The Hardy Boys!

I read a variety of books in different genres, from detective stories to fantastical stories.

Because there's something special about the way you write

Once I have a book, I can't stop until I finish reading it

Even if it's a book that takes hours to read

I did a lot of research on the fastest bike in the world!

My favorite is the Ducati ZZ143! This is the fastest bike in the world – because it is! I also like the Pulsar 220 DTSI, which is the fastest in India! The girl's father sells flowers on the roadside

The boy has been in school for five years

It's strange, isn't it? Boys all over the world love fast bikes for some reason.

When we introduced the system of teaching in English, we also decided to introduce ICSE, which is the best curriculum available.

But people laughed and said, "There's no way these kids can follow such a strict curriculum.

What are you doing?”

But instead of keeping up, aren't you ahead?

How the kids are doing - I want you to come and see

And it's been said that slum parents would rather send their children to work than to send them to school.

It's all bullshit

All parents want their children to have a better life than they did, and they have to believe that it's possible.

(Hindi) 80% attendance at parent-teacher meetings

Sometimes it's 100%, higher than most big schools.

Fathers also started participating

Interestingly, in the past -- the parents who stamped their mother's stamp on attendance checks.

now it's time to sign

the children taught

the impact of children is amazing

At the end of last year, a few mothers came over and said, "We want to learn to read and write too. Can you teach us?"

So I started an after school for mothers.

Every day, 25 mothers come to school after school to study.

I want to keep doing this and expand it to other schools.

98% of fathers are alcoholics

I can imagine how difficult the living conditions for children are.

We have to send the fathers to rehab, and when they come back, we need to find jobs for them so they don't go drinking again.

Three fathers have been trained in cooking so far

Teach about nutrition and hygiene—

I even helped set up the kitchen—now I make school lunches for the kids.

You're doing a really good job, because your kids are eating your food, and most importantly, for the first time, they're respecting you and realizing the value of what you're doing.

More than 90% of non-teacher staff are parents and their families and relatives.

We've started many programs to help children come to school.

Get older kids into vocational training -- so they can't stop going to school.

Children from slums, they say, don't get along with kids from other schools.

See here. She was one of 28 students who were selected for the Duke University Talent Development Program at the Indian Institute of Accountancy in Ahmedabad.

It was a great honor to be part of this program.

Everyone got along well and I made a lot of friends!

I think my English has improved by talking to my friends and the people I meet there.

Students from different societies with different ways of thinking and standards - I was able to meet them.

everyone is very nice

I got along well with most of them!

Coming from Delhi and Mumbai - I got along very well with my students.

I still keep in touch on Facebook

I feel very different after joining this program and interacting with so many people.

Before, I couldn't communicate well with people.

I couldn't immediately talk to someone I met for the first time

I think my English pronunciation has improved a lot.

I learned a lot of games like soccer, volleyball and frisbee.

I didn't want to go back to Bangalore

let me stay here I thought the food was so delicious

That was awesome! I was also happy to hear the clerk say, "Miss, what shall we do?"

(Laughter) (Applause) This girl worked as a maid before she came to school.

I am now aspiring to be a neurologist.

Children are very active in sports

I'm very good

The best school in the inter-school athletic competition held annually in Bangalore with 5,000 participants from 140 schools.

Selected for 3 consecutive years

Admiration for the medal ― I came home with a lot of friends

Last year, a few students from an elite school came to us and asked us to transfer them.

came to say

What is the reason for this phenomenon confidence?

Professors from MIT Berkeley, Stanford Indian Institute of Science, etc. come to the school, and from chemical formulas and experiments, it becomes a means of expression and healing.

Beyond music and art and academics -- it teaches us a lot.

What's important is the content at that school-

I believe that it's what's actually happening, not the facilities and equipment like the library or the restrooms.

I believe that real education is about providing a learning environment where children can pursue their inquisitive minds.

When I started Parikrama, I had no idea where I was going.

I didn't ask the experts to come up with a plan.

But what we want to do is clear: no matter how many, we want to make sure that each child is seen and that they reach their full potential.

It's about quality, not quantity, and the numbers will follow.

Now, with the help of companies, we can open the next and the next one.

Even now, the idea of ​​one person at a time hasn't changed

5 year old parshuram

A few years ago, I was picked up at a bus stop while I was begging, and now I'm living in an orphanage. I've been in school for four and a half months.

going to kindergarten

i am learning english

Here we have a three-month course where you can speak and understand English.

Parshuram will tell you stories of crows, crocodiles and giraffes in English.

When asked what he likes to do, he replied, "Eating, sleeping—

And play! ”

If you ask them what they want to do, they will say, "I want to do horses!"

This means "I want to go horseback riding"

Parshuram came to my room every day

They rub my stomach because I believe it will bring me happiness When I started Parikrama I will change the world! There was an arrogant idea that

But I found myself changed

I learned a lot from my children

Imagination and creativity - compassion - and love

Parshuram is Parikrama. It starts easy, but the journey is long.

Years from now, we'll be standing on this TED stage -- our parshuram.

thank you

(applause)

Before I sing, I'd like to begin with the famous Petrarca Paradox poem by Sir Thomas Wyatt, "I find no peace, all my battles are over, I fear, my desires, I burn, I freeze like ice. I fly higher than the wind, but I cannot rise higher than the sky. I have nothing, I hold the whole world."

I want what I can't have I need what I shouldn't want I don't have what I want I want what I can't have I need what I mustn't want I don't have what I want I have I want what I can't have I need what I shouldn't want I have but I don't have All I have is like a burden of what I've lost Carrying my weak back Lose me on the last train Sweetheart don't suffer There's a ray of hope behind every cloud Just a little rain Just a little rain I want what I can't have I need what I shouldn't want I don't have I have what I want I have I want what I can't have I need what I shouldn't want I have but I don't have My heart is restless My heart gives the go-ahead No one can catch me . . I can't stand in line forever I'm tired of "maybe later" just enduring the cold air Waiting for my luck Either get happy or pretend to be happy or give up 'Cause I gotta give it a name I gotta see it So please please, oh please, please Unstoppable, my heart gives the go-ahead Good things must be here. . . Yeah right here right here right here I can't live this life forever I can only live this life once I'm sick of the line "Maybe later" Either grab happiness or pretend to be happy Or give it up I'll give it a name and demand it Gotta get it in my hands Oh please please me right I want what I can't have I need what I shouldn't want I don't have I have what I want I want what I can't have, I need what I shouldn't want, I have what I don't have. . . You know my heart is unstoppable My heart gives the green light No one can catch me My heart is unstoppable My heart gives the green light 'Cause I want what I can't have I need what I shouldn't want 'cause I have what I want I want what I can't have I need what I shouldn't want I want what I can't have I need what I shouldn't want I have and I don't have I want what I can't have I need what I shouldn't want I have but I don't have what I want

we are drowning in a sea of ​​news

Reuters alone publishes 3.5 million news articles a year.

Only one company

How much of that news is important in the long run?

That's the idea behind "long news."

It's a project by the Long Now Society, founded by TED associates like Kevin Kelly and Stuart Brand.

We're looking for news stories that will matter 50 years from now, 100 years from now, 10,000 years from now.

There's not a lot of news that stays when viewed through such a filter.

Let's take a look at last year's top news story from the Associated Press (Miracle on the Hudson) Will this still matter 10 years from now?

(Fort Hood base shooting incident) What is this?

(Michael Jackson dies) Or is this?

(swine flu epidemic) Really?

(Afghan conflict) Will it still matter 50 years from now, 100 years from now?

(President Obama's inauguration) Well, this was cool though

(Laughter) But last year's biggest news was the economy, and I think sooner or later this recession will be history.

So what news will make a difference in the future?

e.g. science

One day, little robots will ride in the bloodstream and treat the body.

Already realized in rats

In recent news, "nano-bees" that exterminate tumors with real bee venom Gene therapy for the brain Creation of micro-robots that can move around the human body

What about resources? How will we feed nine billion people?

It's hard even with the current 6 billion people

As we said yesterday, over a billion people are starving.

Without GMOs Britain would starve

Luckily Bill Gates invested $1 billion in agricultural research

What about world politics?

The world will be very different when China takes over, and it may indeed be.

China has overtaken the United States as the world's largest car market, surpassed Germany as the world's largest exporter, and has begun using DNA testing to help guide children's careers.

Various ways have been found to push the boundaries of knowledge

Recent discoveries include the existence of giant colonies of ants that have spread from Argentina to every continent except Antarctica Scientist robots that make autonomous discoveries Science may no longer need humans One day life may no longer need humans Microbes have awakened after 120,000 years

With or without humans, life seems to go on.

But if I had to pick the longest piece of news from last year, it would be the discovery of water on the moon.

Makes it much easier to colonize the moon

If NASA doesn't do it, China might, and someone here might write a huge check.

What I'm trying to say is that some news is important in the long run, and some isn't.

(applause)

At TED, we often talk about leadership and how we make society work.

Now, in just three minutes, I'm going to watch a social movement take place and draw lessons from it.

First, leaders must have the courage to stand up and be ridiculed.

But it's very easy to follow his actions.

This is where the first follower plays an important role, showing everyone how to follow.

watch the leader treat him as an equal

Now it's not just one leader, it's multiple.

I'm calling my friends

Being the first follower is an underrated, but actually a form of leadership.

It takes courage just to stand out like this

The presence of the first follower turns a single idiot into a leader.

(Laughter) (Applause) Now we have a second follower.

Now it's not one idiot, not two idiots, three is a group, and a group is news.

So the movement becomes public

It's not just the leader, but the follower that matters, because new followers don't imitate the leader, they imitate the follower.

Two more joined, followed shortly after by three.

Now it's gaining momentum, it's reached a tipping point, and it's become a movement.

The more people involved, the smaller the risk.

For those who were undecided, now there is no excuse not to join.

I won't stand out anymore I won't be laughed at If I hurry, I might be able to join the core group

(Laughter) For a while after this, people will try to join the group, because if you don't join, you'll be ridiculed.

this is how the exercise starts

Let's Recap Our Lessons

First of all, if you're a solo dancer like him, it's important to remember that it's important to treat your first few followers as equals.

But there's a bigger lesson.

Did you notice? The biggest lesson is that leadership is overrated.

Yes, the naked man was the first. He's got his credit.

It's often said that everyone should be a leader, but that doesn't work.

If you really want to start a movement, have the courage to follow suit and show others how to do it.

When you see a lonely idiot doing great things, have the courage to stand up and be the first to join.

TED is the perfect place for that.

thank you very much

(applause)

First question: When was the last time someone called you "childish"?

I'm constantly told not to be "childish"

When you make unreasonable demands, when you act irresponsibly, or when you do anything else that's normally American, people say you're "childish."

I'm really tired

Think about the world's problems: imperialism, colonialism, world wars, George W. Bush.

Who is to blame? are adults

What have the children been doing in the meantime?

Anne Frank wrote a powerful story about the Holocaust that touched the hearts of millions.

Ruby Bridges helped desegregate America

More recently, Charlie Simpson raised £120,000 for Haiti on his little bike.

Evidence like this shows that age doesn't matter.

Behavior accused of being "childish" is common among adults, and we should stop using this ageist term to criticize irresponsible and irrational behavior. (Applause)

thank you

On the one hand, the world may need some kind of irrational thinking.

I used to have a big plan Don't you throw it away by yourself? You think it's impossible, it's too expensive, it's not in your best interests

For better or worse, we kids aren't deterred by reasons why we shouldn't be doing it.

Children are full of exciting aspirations and hopeful thoughts. They dream of a world where no one will starve, a utopia where everything is free.

How many of you still have that dream and believe it's possible?

Sometimes, our knowledge of history and the failure of utopian ideals can hold us back. If everything were free, we might run out of food stocks, famine, and descend into chaos.

On the other hand, we children still dream of a perfect world.

That's a good thing, because if you want something to happen, you first have to dream it.

In many ways, our bold imaginations help us expand the horizons of what is possible.

For example, the Glass Museum in Tacoma, Washington. My hometown. Long live Washington!

(Applause) In "Glass Design for Kids," kids draw ideas for glass crafts.

The glass artist there says he got the best ideas from this program.The kids don't think about how hard it is to blow glass into a certain shape.They just think about the cool ideas.

When you think of glasswork, you might think of colorful Chihuly creations and Italian vases, but kids want more from a glass artist, and this is "a broken hearted snake" and "a bacon boy with a meat ray."

(Laughter) Our wisdom doesn't have to be child-only knowledge.

Children have already learned a lot from adults, and they have a lot to teach them.

I think adults should start learning from children

I like this analogy because I often speak to school people, and the teacher shouldn't be the only one running the classroom and telling them what to do and what to do.

Students should teach their teachers too

Education between adults and children should be reciprocal.

The reality is, unfortunately, otherwise, and lack of trust is a big part of it.

When you don't trust someone, you limit them.

If I doubt my sister's ability to pay the 10 percent interest that I set on the loan, I won't accept any more debt until I pay off my current debt. (Laughter)

By the way this is a true story

Adults generally have restrictive attitudes toward children, from school handouts with detailed "Don't do that" and "Don't do this" to school Internet access.

As history has shown, regimes become more oppressive when they are less likely to manage them.

Adults may not be as bad as totalitarian regimes, but children have little say in making rules. Adults should take into account and learn what young people want when they really need reciprocity.

What's worse than limitations is adults underestimating children's abilities.

We like challenges, but if the expectations are low, we're going to do low things.

My parents never had low expectations of me or my sister.

I was never asked to be a doctor or a lawyer, but the books my father read to me were Aristotle and People Fighting Germs, while all the other kids were listening to "The wheels of the bus are spinning."

We heard it, but "People Fighting Germs" is by far the coolest.

(Laughter) I've been writing since I was four years old, and when I was six, my mother bought me a laptop with Microsoft Word.

thank you mama and bill gates

I wrote over 300 short stories on that little laptop, and I wanted to turn them into a book.

My parents didn't laugh at me that my kids wanted to publish a book, and they didn't tell me to wait until they were older.

Many publishers are reluctant

One big children's book publisher said, ironically, "We don't work with children."

Children's publishers don't work with children?

Are you neglecting your best customers?

(Laughter) A publisher called Action Publishing showed courage and trusted me and listened to what I had to say.

And then my first book, "Flying Fingers," was published.

Since then, I've spoken to hundreds of schools, keynotes to thousands of educators, and I'm speaking to you today.

I'm very happy to hear from you all because you really care and listen.

But there's one big problem with the rosy story that these kids are so much better than adults.

Children grow up to be adults like you.

(Laughter) But will I really be like you?

The goal is for our children to grow up to be better adults than you are, but given your accomplishments, that can be a challenge.

But progress happens as new generations and new eras grow and develop and become better than the previous generation.

That's why we're not in the dark ages

No matter where you are in life, it's imperative that you create opportunities for your children so that they can grow up and blow you away.

(Laughter) Grown-ups and TED Fellows, listen to your children, learn from them, trust them, expect more from them.

The reason you need to listen today is because we children are the leaders of tomorrow.It's the children who will take care of you when you're old and lazy.Just kidding.

We are the next generation, pushing the world forward

If there are people who think they have nothing to do with you, think about cloning technology, and then you'll have to live your childhood all over again, and then, like our generation, you'll want to be heard.

The world needs new leaders and new ideas

Children need opportunities to lead and succeed

Are you ready?

Because the problems of the world shouldn't be the heritage of the human family.

thank you very much

(Applause) Thank you, thank you.

"People do stupid things

It spreads HIV."

There was a headline in the Guardian newspaper the other day.

What do you think? If you agree with this, please raise your hands.

one or two brave ones

Actually, these are the words of an epidemiologist who worked in the field of HIV for 15 years on four continents and who you see now.

Well, I would argue that this is only half true.

People get HIV because they do stupid things, but most of them do stupid things for perfectly rational reasons.

Now, "rational" is the prevailing notion in public health. When you put on the glasses of a public health geek, you see what's good for you and what's not. If you give people the information they need, give them the services to act on that information, give them the services to act on that information, give them a little bit of motivation, and they make rational decisions, they live longer, healthier lives.

wonderful

As someone who works in the HIV field, I'm a little skeptical about this, and I'm sure you all think that HIV is about poverty and gender inequality, and if you're at TED2007, it's about the price of coffee.

HIV is actually about sex and drugs, and if there are two things that make people a little irrational, they're erections and addiction.

(Laughter) First, let's talk about what makes sense for drug addicts.

Now, I was talking to my Indonesian friend, Frankie.

At lunch, I heard about when he was in a prison in Bali for drug injections.

It was someone's birthday, and they were kind enough to bring in some heroin, and the main character was so generous that he shared it with all his friends.

All the heroin addicts line up, and the main guy fills up the syringe and starts injecting it.

You inject the first person, you wipe the needle with your shirt, and you inject the next person.

Frankie said, "I'm on number 22 and I can see the needle coming and there's blood all over the place.

Gradually my head becomes dim

A small part of my brain thinks 'This is so dirty and it's really dangerous' But most of my brain thinks 'I hope there's a little bit left until it's my turn'

I'm thinking, 'Please, leave me a little bit.'" And in this story, Frankie said, "I'm sorry. Drugs make me really stupid."

it's not wrong

As a matter of fact, Frankie was in prison at the time for heroin addiction.

The only choice he had was to accept the dirty needle or not get high.

If there's one place where you really want to get high, it's prison.

But I'm a scientist and I don't want to use anecdotes as proof data, so let's look at some data.

I spoke with 600 drug addicts in three cities in Indonesia and asked them, "Do you know how to get HIV?"

"Of course, if we share the needle."

Nearly 100 percent said it was because of needle share.

I asked, "Do you know where I can get cheap, clean needles to avoid that?"

100% "of course"

"I'm addicted to heroin, so I know where the clean needles are."

"Then do you carry needles?"

We're going to do real interviews on the side of the road where people hang out and do drugs.

"Do you carry clean needles?"

At most, one in four

So it's no surprise that only about 1 in 10 actually used a clean needle for each injection in the previous week, while the remaining 9 in 10 shared.

So there's a big gap. Everyone knows that if you share, you'll get HIV.

What do you mean? Does sharing get you high?

When I asked drug addicts about this, they said, "Aren't you stupid?"

"I don't want to share my toothbrush with my sex partner, not even the needles.

horrifying

I share needles because I don't want to go to jail."

Yes, in Indonesia back then, if you carried a needle with you and were caught by the police, you would end up in jail.

Doesn't that change the equation a little bit?

Because in this case, the choice is either to share the needle here and get sick in 10 years and you might die, or you can use your needle now and go to jail tomorrow.

Drug addicts think it's bad to expose themselves to HIV, but they think it's much worse to spend the next year in prison and, like Frankie, end up with HIV.

And then suddenly needle share becomes a perfectly reasonable thing to do.

Now let's look at it from a policy maker's point of view.

this is a very simple problem

Only this time, the motives are not conflicting.

It makes sense from a public health point of view.

We want people to use clean needles drug addicts want to use clean needles

Now, if we could make clean needles ubiquitous and stop worrying about getting arrested, we'd solve this problem.

Now, the first person to understand it and translate it into national action was the famous sympathetic liberal Margaret Thatcher.

She introduced the world's first nationwide needle exchange program, followed by Australia, the Netherlands, and several other countries.

In all these countries, less than 4 percent of syringe users have become infected with HIV.

Where this wasn't done, in New York City, Moscow, Jakarta, for example, during peak hours, one in two syringe users contracted this deadly disease.

By the way, Margaret Thatcher didn't do this because she loved drug addicts.

Because you ruled over a country with a national health service.

So if you don't invest in effective prevention, you'll end up paying for treatment later, which is obviously much more expensive.

So she made a politically rational decision.

Now, if you put your public health nerd glasses out here and look at this data, it looks pretty simple.

But in a country where governments don't seem to recognize their obligation to provide health insurance to their citizens -- (Laughter) -- they're taking a completely different approach.

We're endlessly validating data in America.

This is a review of hundreds of studies by various authorities in the American scientific community, and on the left is the study that shows needle programs are effective.

Quite a lot. On the other hand, the studies that show that the needle program is ineffective... you would think that this is that tantalizing dynamic slide where I press a button and the rest comes out.

(Laughter) Nothing to add to the right side.

So you think it's completely unreasonable

But wait a minute, politicians are rational too. Politicians are doing what voters would want.

So voters' reaction is good for children, but cold for drug addicts.

(Laughter) So it makes a lot of sense to deny service to syringe users.

Now let's talk about sex

Are we more rational when it comes to sex?

Now, let's ignore the obviously irrational views, like the Catholic Church, where people think that if you hand them a condom, everyone will run out and have sex.

I don't know if Pope Benedict watches TED Talks online, but if he does, I have something to tell you.

(laughs) It's not that sweet.

I hope you can do better

(Applause) Now, seriously, HIV isn't actually transmitted through sex that easily.

It depends on how much virus you have in your blood and body fluids.

In the first infection, the virus levels are very high at first, then you start to develop antibodies, and then you fluctuate to very low levels, and this lasts for a long time, 10 to 12 years, even if you get another sexually transmitted disease and you get a temporary spike.

It's basically a trivial state until you start showing symptoms of AIDS, at which point you look unhealthy, you don't feel great, and you don't have much sex.

So sexual transmission of HIV is basically determined by how many partners you have in a short period of time, when your viremia peaks.

Now, this makes people angry, because it's seen as stigmatizing them by talking about groups that have more sexual partners in a short period of time than other groups.

I've been wondering about this for a long time, because stigma is bad, but lots of sex is pretty good, right?

In fact, 20 years of excellent research has shown that there are groups that have many partners in a short period of time.

And that group is prostitutes everywhere in the world and their usual partners.

Party-going gay men Their number of partners is Party-going non-gay men

Three times as many on average, and heterosexuals in countries with a tradition of polygamy and relatively high levels of female autonomy, most of which are in eastern or southern Africa.

And this is reflected in today's fashion

It's reflected in these terrifying numbers for Africa.

These are all countries in southern Africa, where 1 in 7 people and 1 in 3 of all adults are living with HIV.

Now, in the rest of the world, the general population is basically doing nothing and the levels are very, very low, but when it comes to high-risk people, like people who inject drugs, sex workers, and gay men, there's an outrageously high rate of HIV infection.

We have data for the Los Angeles area, and it's 25 percent infected among gay men.

Of course, you can't get HIV from unprotected sex alone.

You can get HIV if you have unprotected sex with someone who tests positive

In much of the world, there are a few failures in this kind of prevention, but these days, commercial sex is doing pretty well, and many countries have 80 to 100 percent condom use in commercial sex.

Again, this is due to matching motives.

What's reasonable for public health is also reasonable for individual sex workers, because more STDs are a big business hit.

nobody wants to take

Customers don't want to bring gonorrhea home

So in commercial sex, we can achieve pretty high rates of condom use.

But in an "intimate" relationship, it's much more difficult, because with a wife, boyfriend, or prospective spouse, there's an illusion of romance, trust, and intimacy, and nothing is less romantic than the question, "Which condom do you use?"

So you have to have a pretty big incentive to use a condom in spite of that.

For example, here is a man named Joseph.

AIDS patient in Haiti

I'm sure he doesn't have much sex now, but he's the one who reminds people that they should use condoms.

This is also a Haitian, maybe a reminder of why you want to have sex.

Interestingly enough, this is also a picture of Joseph after six months of antiretroviral therapy.

That's why it's called the Lazarus effect.

But this is changing the weighting of what is rational in sex decision-making.

So some people say, "Treatment lowers your viral load and makes it harder for you to transmit HIV, so it's actually an effective prevention, so as long as you have treatment, you'll be fine."

So if you look at viremia again, you're going to get sick, and when you start treatment, your viral load will go down.

How does that compare to no treatment?

Yes, you die, so your viral load goes to zero.

All of this green stuff, including the spikes because you couldn't go to the pharmacy, or you ran out of your medicine, or you were at a party for three days and forgot to take your medicine, or you started to develop resistance, all of this is a virus that wouldn't exist without treatment.

"Now that's a great preventive strategy. Let's stop the treatment."

I'm not saying

of course not

Antiretroviral therapy needs to be as widespread as possible

You're questioning those who say that just more treatment is enough prevention.

This is far from true, and I think there is much to be learned from the experience of gay men in wealthy countries, where treatment is widely available, for about 15 years.

I think there was little help from public health geeks, but condom use was actually very, very high in the homosexual community that responded to HIV very quickly. And we've seen that condom use go down exponentially since the development of the treatment. And it's really for two reasons.

The other is that people are simply not as afraid of HIV as they were of AIDS, which makes sense.

AIDS was a disfiguring and dying disease, but HIV is an invisible virus that you have to take medicine for every day.

I'm sick of it, but no matter how drunk I am or how much I'm rushing, is it so bad that I have to use a condom every time I have sex?

The data tells us the answer to this question: it's subtle.

This is data from Scotland

You can see the peak of people injecting drugs before the start of the national needle exchange program.

then decreased

Even if you're heterosexual, mostly for commercial sex, and you're a drug user, you've calmed down since there was a cure, and that's because of the alignment of motivations I talked about earlier.

But among homosexual men, there is a much steeper rise after three to four years, when treatment becomes widely available.

This is new infection data

What do you mean?

The combined effect of less worry and more people in the population carrying the virus, more people living healthier and longer lives, and more likely to have sex with someone living with HIV, is outweighing the effect of lower viral load.

What do you mean?

More treatment means more prevention

Is that so?

No. I call it the "mystery of compassion."

There's been a lot of talk about compassion in the last few days, and I'm not in the mood to donate to good sexual and reproductive health services for sex workers, or give needles to drug addicts.

But when they go from unforgivable, unconventional people to AIDS victims, all of a sudden, I feel total sympathy for them, and I'll buy them super-expensive medicines until they die.

From a public health perspective, this makes no sense at all.

I'm nearing the end, but I'd like to introduce you to Ines' words.

A transgender prostitute on the streets of Jakarta, a woman with a penis.

Why do you do this kind of work?

Of course it was forced, or because there were no better options.

If you teach her how to sew and give her a good job in a factory, all will be well.

Here in green is the Indonesian factory worker's hourly wage, an average of 20 cents.

There are slight differences from state to state

I spoke with 15,000 sex workers to create this slide, and they said that per hour sex workers earn is the value of an orange.

So even if it's not a good job, it's certainly a pretty rational choice for many people.

Well, it's Ines

(Video) We have the tools, the knowledge, the money, the commitment to prevent HIV.

(Ines) Why is the number of infected people still increasing?

it's all politics

Nothing makes sense when it comes to politics

(Pisani) "When it comes to politics, nothing makes sense."

In other words, politicians don't make sense to sex workers.

To public health geeks, drug addicts are doing stupid things.

So the reality is that everyone has a different rationale.

There are as many ways to act rationally as there are people on the planet, though that's the beauty of human existence.

Each form of acting rationally is not unrelated to the other. For someone who injects drugs, it makes sense to share needles.

But the point is this: we are the voters.

Of course, we're not the only voters.

TED is a community of thought leaders, and I believe that everyone in this room and watching this online has an obligation to demand from politicians policies that are grounded in scientific evidence and common sense.

It's going to be very difficult for us, as individuals, to influence what's reasonable for Frankie and Inez around the world, but at least we can vote to stop politicians from doing stupid things that spread HIV.

thank you

(applause)

This is not a technical story, it's a human story.

I'm sure many of you have seen the video recently shown on the TV program "60 Minutes."

There's a guy who's now head of a Veterans Affairs organization, and he himself lost his arm 39 years ago in Vietnam, even though he said prostheses were useless.

While the cameras were rolling, I totally changed my mind. He put on our prosthesis, and within two hours he was able to pour himself a drink.

I think I went a little too far, and I'll show you a video.

It's a short one, about a minute long. It's a grainy home video footage I shot earlier, but I think it tells the story better.

A few years ago, I was approached by the head of DARPA, which invests in cutting-edge technologies that universities and corporations don't touch.

They are particularly interested in technology that helps soldiers.

I often get these unexpected visits, in a conference room, between an elderly military doctor and his DARPA chief.

I was told that the U.S. military is now providing great technology to soldiers in remote areas like the mountains of Iraq and Afghanistan.

When a soldier is wounded, he can be picked up and brought back before the smoke clears, and he can receive state-of-the-art emergency medical care sooner than if we were in a car accident in a major American city.

this is good news

If the soldier you rescued has lost an arm or a leg or part of his face, you probably won't be able to get it back.

How many young people have lost their arms, they gave numbers.

An army doctor angrily said, "In the Civil War, when soldiers fought with muskets and lost an arm, they gave them wooden sticks with hooks.

Now that we are in an age of fighting with F18s and F22s, why are soldiers who have lost their arms still being given only plastic sticks with hooks? ”

He said that's unacceptable, and he said, "We're here because we want you to make it.

Can you please make me a prosthetic hand?”

I was just wondering if that would give me the standard 500-page bureaucratic paperwork of the Department of Defense.

I say no, "No, I'm bringing a soldier who has lost his arm here, so I want him to put on a prosthetic arm you made and pick grapes and raisins.

Don't crush the grapes

Efferent/afferent nerves need tactile sensors

"So that you can grab the raisins without dropping them."

Delicate motor control and degree of freedom of wrist and elbow Shoulder also needs degree of freedom and abduction function

"Of course you can eat

The prosthesis is 80 cm to the fingertips and weighs less than 4 kg to fit a standard-sized woman.

including battery

Everything has to fit inside."

When they finished talking, I, being a shy person, said,

"You guys are out of your mind"

(Laughs) "You watch too much Terminator."

(Laughter) And the doctor said, "I want you to know that there are more than 20 young men who have lost both of their arms and come back."

I couldn't imagine it. I know you have better imaginations than I do, but I can't imagine losing an arm at the age of 22.

But compared to losing both arms

It's just a little inconvenient

Anyway, I went home that night and thought

I literally couldn't sleep at all, wondering how I would roll over without my shoulders.

so i thought i should do this

I'm already very busy with my daily work

Invest in your dreams such as FIRST, water purifiers, and solar power generation

I had my hands full

Still, I thought, "I have to do this."

I did a little research, and I went to Washington, and I said to them, "I still think you're crazy, but I'm going to do it.

I make the arms

It'll probably take 5 years to get through the FDA and 10 years to get something working well enough.

It's like building a new iPod."

"Give me two great years," he said.

(Laughter) "It takes a year to build a full-featured arm under four kilos.

It will take another nine years to make it functional and useful."

I agree that you didn't agree

I went back to the company and put together a team of the best people who were passionate about making this happen.

And exactly one year later, we built a prosthetic hand with 14 degrees of freedom, all the sensors, all the microprocessors, all inside.

I could show you something that's eerily real, with beauty, but that doesn't show the point.

I thought it would take years to make it practical.

It's amazing what you can do when you have the drive, the ability and the determination to do something, like that prosthetic runner, Amy.

What I learned in just 10 hours of use Two men, one of whom has no arms

One has no shoulders and the other has no top above the upper arm.

Chuck and Randy spent 10 hours trying out a prosthetic hand with us.

Low-quality home video footage

I'll show you later. It's a little over a minute long. Chuck does something I envy.

He picked up the spoon, scooped out the milked cereal, held the spoon horizontally, and with a wonderfully synchronized joint, brought it to his mouth without spilling a single drop of milk.

(Laughter) I can't

(Laughter) his wife

He was standing behind me, and his wife said, 'Dean, this man couldn't eat himself for 19 years, please.

Give us a prosthesis, or take the master."

(laughs) Can you see it?

This is the chuck, move all the joints at once.

I'm punching my staff. Behind the scenes is a technician-surgeon who's a nice person to have around.

This is Randy, they're handing them a little rubber ball.

In the spirit of FIRST, we celebrate and celebrate each other with respectful professionalism.

this is not easy

Imagine one of you doing this with a wooden stick with a hook on it.

Chuck is going to do something special, which is amazing, at least given my limited physical abilities.

That's what DARPA asked me to do.

Pick the grapes, don't drop them, don't crush them, pick them up and eat them.

15 months after that day, we've come this far.

(Applause) But as Richard said, technology and processors and sensors and motors are not the subject of this talk.

I've never dealt with a problem like this before, in this area of ​​medicine.

Here are some of the amazing things I've faced since I started developing.

We felt we had a pretty good design. We had to consider all the engineering trade-offs: weight, size, cost, function, and you can only do three of the four things at once.

It doesn't matter if the Department of Defense likes the prosthetic hand."

They didn't look too happy when I said this, but they said, "It doesn't really matter what you think."

"The important thing is whether or not young people who have lost their arms will use this prosthetic arm."

And I said to the engineers, "If you go to Walter Reed, you're going to see a lot of people who've lost parts of their bodies, and I'm sure they're angry and depressed and frustrated.

I must give them support and encouragement

that we are going in the right direction no matter what

We need to get enough information out of them to confirm."

When I got to Walter Reed, I realized I could not have been more wrong.

I've seen so many people who have lost parts of their bodies, and what's left is burned, half of their face missing, their ears burned off.

they were gathered at the table

we started asking them

"We are not yet close to nature

You can have fine motor control, you can lift 20 kilos, but you can't do both at the same time.

You can either lower the gear ratio and make it go faster or you can give it more power, but you can't do both."

I was trying to figure out what to make for them.

Not only did they cooperate enthusiastically, they saw it as their duty to help.

"Hey, is this helpful?"

I said, "You guys have done enough

We're here to help you, how can we help you? ”

About half an hour later, I noticed a person in the corner of the table who didn't open his mouth very much.

I think I'm missing an arm

I was poking my cheek with my other arm

I said to him, "Hey, you don't talk much, do you?

Which do you think is better, this or this? I heard

He said, "No, I'm... the lucky one in here."

I lost my right arm, but I'm left-handed."

(Laughter) That's why he didn't open his mouth.

All of them, including him, had great spirits.

he also made some comments

After the meeting was over and everyone said goodbye

The young man from earlier pushed the table away.

I didn't have legs

and we came home from the hospital

I felt that it was they, not us, who gave them support and encouragement.

And it didn't end there.

it was amazing

when we get back to work

We worked harder and faster

Then I went to Brooke Army Medical Center.

I have met many young people who need prostheses

their positivity was amazing

When I came back to work, I worked even harder.

Eventually, we entered the clinical trial stage and had five people test it.

everyone was happy

One day, I got a call from Washington.

I was called by Walter Reed, and there was a young man in his twenties who had been injured in a bomb, and he was taken to Germany.

Twenty-four hours later, it was transported from Germany to Walter Reed.

He said that he is here now and that he wants me to come right away.

The young man was brought to his room

without legs

without arms

Only a portion remained on one side

Half of his face was missing, but he said his eyesight was returning.

one eye was fine

His name is Brandon Morocco.

He said to me, "I need the arms you made. I need two of those."

"I'll give it to you," I replied.

The young man was from Staten Island

He asked, "Before I went to war, I used to drive a truck, and it's the one with the shift lever.

Will I be able to drive again?"

I replied "of course"

After I answered that, I thought, "How can I do this?"

(Laughter) Anyway, he's just like everyone else.

didn't want much

He wanted to help others. He said he wanted to come back and help others.

on the way home from the hospital

I was asked to stop by Texas

There was a big event where 3,500 veterans gathered to help the families of young military veterans, like Brandon, who had lost part of their body or had died. I was asked to give a speech.

"What should we talk about?

I said, "If you lose a part of your body, you can use this device, but there's still room for improvement. I can't tell you a good story."

"You must come"

I went there after being told that

There were a lot of people in treatment there.

Some recovered better than others

But they were all showing great positivity in the face of hardship, and just having someone caring made all the difference for them.

Let's finish by saying just one more thing

I don't think it's meant to be malicious, but there are people in the world who say, "How much do you get as a special pension?"

As you all know, there's been a lot of debate about the healthcare system.

who is entitled to what

who gets how much

who will bear

it's a hard question

Just because you were born in this country doesn't mean you get everything.

I wish we could, but it's not possible. We have to be realistic.

there will be disagreements on difficult issues

i don't know the answer

there are other hard problems

Do you really need to go to war?

How should I withdraw?

what do i have to do Opinions will differ here as well, and I can't find an answer either.

These are issues of politics, economics and national strategy.

I don't know the answer, but let me give you an opinion.

this is the short answer

I know what these young men deserve medically.

I spoke with a young man and he likes the arm I made. It's so much better than a plastic stick with hooks on it.

I told him, "The world's first airplane was made by the Wright brothers in 1903.

I think I flew 30 meters

Then the pigeons wouldn't have been envious

But now it's the F15 Eagle, even the bald eagle

Can't fly at Mach 2

I'm sure someday we'll make this something great."

And I promised, "I won't stop until your friends envy what you can do with arms like Luke's.

Keep improving, never stop until it does

There will be a great deal of controversy in this country.

There will also be complaints about foreign policy.

But when we have the luxury of complaining about who pays what and what we get, it's those who go to war who give us the privilege to do so. I know they deserve everything a human being can do.

we should give it to them

(applause)

Exactly a year or so ago, I had a visit from a senior Pentagon official.

He said, "Of the young men sent to war, 1,600 return home without at least one arm.

Whole arm No shoulder joint

And we're still doing what we did in the Civil War, prosthetic arms and claws.

They deserve more than that."

And literally, this person sat in my office in New Hampshire and said, "I want you to make something for these young people so that they can grab a raisin or a grape on the table, see the difference without looking, and put it in their mouth without breaking it."

efferent nerve, efferent nerve, tactile response

After he finished explaining, he handed me a big plan that weighed over 100kg and said, "That's what I want."

I said, "Are you insane? We don't have this technology anywhere yet.

I can't

Something that fits in a human arm and has 21 degrees of freedom from the shoulder to the fingers."

He said, "Out of 1,600, about two dozen young men came home with both arms missing.

Is it bad to lose one arm?

Compared to not having both arms, it's just inconvenient."

I already had my day job, and my nights and weekends were already filled with solving the world's water problems, power problems, education problems, etc. Chris, I'm not talking about that.

I kept thinking about young people without arms

"We've done a lot of things all over the country," he said.

We've got some great people in neurology and other fields," he said.

I said, "I'll take a look around, see what kind of people there are."

In the following months, I traveled to many places, all over the country, including here, and found the best

He went to Washington, met with people he had met before, and said, "I did what you asked me to do. I saw what I had.

I still think you're insane, but not as much as before."

A little over 13 months ago, we put together a team of about 20 people.

I said let's build the device he wants

Have 14 DOF out of 21; Decided you don't need 2 fingers

combine those

I took it to the Navy Medical Center a few weeks ago, a place you see a lot in the news these days, unfortunately.

I showed it to various people

One person said he was lucky that he was right-handed and lost his left arm.

sit at a table with seven or eight people

He said he was lucky to have a usable arm, and he pushed himself off the table, and he had no legs.

young people with incredible ideas

What I'm going to show you now is 30 seconds without the skin, and that's the end of the story.

But understand: what you're looking at here is small enough to fit in the arms of the average woman, and it fits in the arms of these young people.

Using CAT scans and MRIs to get information about the moving arm, we create silicone rubber, cover it, paint it three-dimensionally, and it becomes a mirror for the other limbs.

You can't see the really cool stuff at work inside the 14 actuators, but the actuators can sense temperature and pressure.

At the same time, it is equipped with an air cuff for fixation, and by receiving weight, it is further fixed.

Remove the weight and it will return to normal

I'm going to show you how to use this to do some simple things. I demoed it in Washington. Can you see it?

Fingers grabbed, thumbs up and wrists

Weighs less than 4kg

scratch the nose

Has 14 active degrees of freedom

I'm trying to pick up the pen with my thumb and index finger

Put it down, take a piece of paper and read it by using the degrees of freedom you have in your hand and wrist.

(applause)

The first robot to introduce is STriDER

It means "tripod dynamic self-excited prototype robot"

A three-legged robot inspired by nature.

But were there any creatures in nature with three legs?

probably not so why? how does it work?

Before we get into that, let's take a quick look at pop culture.

You know the H G Wells "War of the Worlds" novel and movie

What we're seeing now is a scene from a popular game. In this fictional story, Earth-threatening aliens are portrayed as three-legged robots.

This is a dynamic simulation video

See how the robot works

The body is flipped 180 degrees, and one leg is passed between the other two legs to help it fall.

I walk like this

Even when people walk on two legs, they don't use muscles to lift their legs and walk like robots.

Actually, I swing my leg to hold it down, stand up, swing my leg to hold it down, and so on.

It's using the weight and physics of the body itself, just like a pendulum.

we call this passive dynamic movement

It's the same when we walk, from potential energy to kinetic energy, from potential energy to kinetic energy.

It's a process of falling repeatedly

So even though we don't have such creatures in the natural world, we're actually taking inspiration from living things and applying the principle of how living things walk.

this is what we want to do next

Fold your legs and shoot far

And then I stick my leg out, like in Star Wars, when I land, I absorb the shock and start walking.

This yellow thing isn't a death ray

It simply represents a camera or some other type of sensor, and it's 1.8 meters tall, so it can see through obstacles like bushes.

made two prototypes

The first thing I made was the STriDER I in the back.

The small one in front is STriDER II

The problem with the STriDER I is that it's too heavy.

Because there were a lot of them, so we integrated the mechanical mechanics.

One motor can control all movements

Instead of using mechatronics, they solved the problem mechanically.

The new one has a light body, so it can be moved even in the lab.

It was a successful first step.

It's not perfect yet, so there's a lot of work to be done.

The next robot is IMPASS

It stands for "Intelligent Moving Platform with Actuated Spoke System"

It is a hybrid of wheels and legs

Think of it as a wheel without a rim, or a wheel made of spokes, where the spokes move individually in and out of the hub, a wheel-leg combination.

We literally reinvented the wheel.

let me show you how it works

This video takes a reactive approach.

It uses tactile sensors in its feet to walk on soft, changing terrain that dents when pushed.

It navigates smoothly over soft terrain, relying on information from tactile sensors.

What do you do when you encounter a big terrain change? Here we're hitting an obstacle that's more than three times the height of the robot, and then it switches to a planned mode of operation, using a laser rangefinder and a camera to identify the size of the obstacle and carefully plan how to move the spokes.

By adjusting it like this, you get very good mobility.

It's probably the first time you've seen something like this, developed by us.

This is the ultra-high mobility robot IMPASS.

Look! Isn't that amazing?

Driving a car uses a method called Ackermann steering.

The front wheels turn like this

Robots with small wheels often use differential steering, where the left wheel and right wheel rotate in opposite directions.

With IMPASS you can make a variety of different types of movements

For example, if the left and right wheels are connected by one axle, and they have the same angular velocity, they can still turn. You can change the length of the spokes.

just an example

The next robot is CLIMBeR "Cable-supported legged intelligent adaptive motion robot"

I talk a lot with the scientists at NASA's JPL, the famous Mars Rover, and geologists always say that the places that are really interesting scientifically are always on cliffs.

Current rovers can't go

So we wanted to build a robot that could scale rugged cliffs.

That is this CLIMBeR

It's hard to see with three legs

Winch and cable on top

and find the right place to put your feet

It calculates in real time how to distribute the force.

Once stable, lift your legs and use the winch to crawl up.

It can also be used for search and rescue applications.

Five years ago, I worked at NASA's JPL for a summer as a research staff member.

At that time, a six-legged robot called LEMUR had already been developed.

This is MARS based on it

"Multi-limbed robot system" It is a robot with six legs.

Developed an adaptive gait planner

You're carrying an interesting load.

students want to have fun

Crossing uneven terrain

Here we are walking on coarse sand, and depending on the wetness and the size of the sand grains, we change the model of the subsidence of our legs. By adapting our gait to the environment, we can successfully traverse this type of terrain.

Let's see what's really interesting

Many people come to visit the lab.

When a customer comes in, MARS walks up to the computer and starts typing, "Hello, I'm MARS.

Welcome to Virginia Tech Robotics Lab RoMeLa"

this is an amoeba robot

I don't have time to go into the technical details, but I'll show you some experiments.

We're at the stage where we're looking at the feasibility of storing potential energy on an elastic surface and moving it.

Or use an elastic cord to move back and forth This is ChIMERA

I'm working with people at the University of Pennsylvania to build an amoeba robot that reacts to chemicals.

When you do something in a certain place, it magically starts to move.It's like a strange creature.

Next is the new robot RAPHaEL

"Pneumatic robot hand with elastic ligament"

There are many commercial robotic hands that are very good, but the problem with them is that they're too expensive, they cost tens of thousands of dollars.

So it's not very realistic to use it for prosthetic limbs, so we wanted to approach this problem in a different direction.

Instead of using electric motors and electromechanical actuators, it uses compressed air.

We've developed a new actuator for our joints that's flexible enough that we just change the air pressure.

You can easily change the amount of force

You can crush an empty juice can

It can also grab fragile objects like raw eggs and light bulbs.

Best of all, it only cost us $200 to build our first prototype.

Next up is a series of snake robots called HyDRAS, which are "ultra-high degree of freedom articulated snake robots."

You can scale terrain like this

This is the arm of HyDRAS

A robotic arm with 12 degrees of freedom

The cool part is the user interface

That cable is optical fiber

This student, probably new to using it, can move the joints in a variety of ways, for example, in a war zone like Iraq.

There is a bomb on the roadside

Now we're sending in remote-controlled armed vehicles.

It's very time consuming, and it's also expensive to train the operators to operate the complex arms.

This robot is very intuitive to operate, and this student is probably new to it.

The next robot is our current star.

This DARwIn actually has a fan club: Dynamic Humanoid Intelligent Robots.

We're very interested in humanoids, or humanoid walking robots, so we decided to try and build a small one.

In 2004, it was very revolutionary.

It was a feasibility study. What kind of motor should we use?

Is it even possible? What kind of control do you need? It doesn't have a sensor yet

is open loop control

I'm sure you all know that if you lose your balance without a sensor...

(Laughter) Building on this success, the next year, we did a proper mechanical design based on kinematics.

DARwIn I was born in 2005

stand up walk

But it's still corded to an external power source and external computation.

still relied

It got really interesting in 2006

We gave them intelligence, they gave them the computing power they needed.

Pentium M at 1.5GHz 2 FireWire cameras 8 gyros Accelerometer 4 torque sensors in the feet Lithium battery DARwIn II is fully autonomous

no remote control

It doesn't have cables, it looks around, it looks for the ball, it looks around, it looks for the ball, it plays football with autonomous artificial intelligence.

Let's see, this was just our first try.

Goal! !

There is a competition called RoboCup

I don't know how many of you know

An international autonomous robot soccer competition

RoboCup's goal is to have a life-size, autonomous humanoid robot play and win against a human World Cup champion team by 2050.

That's the real goal, the ambitious goal

we believe we can

2008 took place in China

We were the first Americans to participate in this competition, and this year, 2009, it was held in Australia.

3 vs 3, totally autonomous match

Sora entered!

Robots compete in team play

very exciting

A research event in the form of a competitive event

This is a beautiful Louis Vuitton Cup trophy.

It's an award given to the best humanoid.

Next year, we hope to be the first team to bring this trophy back to America.

(applause)

DARwIn has many other talents

Last year I conducted the Roanoke Symphony Orchestra at a holiday concert.

This is the next generation robot, DARwIn IV, smarter, faster and stronger.

Trying to show off that ability "I'm macho, I'm strong"

You can even do kung fu action like Jackie Chan

(Laughter) And walk away. This is DARwIn IV.

available in the lobby

We want this to be America's first robot that can run, so stay tuned.

You've seen our exciting robot in action

So what is the secret of our success?

how do you figure it out

How do you develop your ideas?

We are building a car that can drive fully autonomously in urban areas at the DARPA Urban Challenge.

won a $500,000 prize

We also built the world's first car that can be driven by blind people.

It's called the Blind Driver Challenge

We still have many exciting robotics projects to talk about

This is what we won in a robotics competition in the fall of 2007.

I have 5 secrets

where do you get your inspiration first

How I get my imagination sparked. This is true and my own story.

When I go to sleep at night, around three or four in the morning, when I lie down and close my eyes, I see lines and circles and shapes floating in the air.

Combined, they form a kind of mecha.

Then I thought, "Oh, this is good."

I take out a notebook by my bed and a special pen with an LED light.

then go to sleep

The first thing I do every morning, before I have a cup of coffee, before I brush my teeth, is to open up that notebook, and it's often empty.

Sometimes something is written

Most of the time I don't even know what's written

It's not unreasonable because I wrote it half asleep at 4 o'clock in the morning.

need to decipher

But sometimes there's a great idea written there, and it's that moment of "I found it!"

I quickly run to my office, sit down at my computer, type in my ideas, draw sketches, and store them in a database of ideas.

And when there's an open call, I'll look for ideas that might fit my requirements, and if there's a good fit, I'll write a research proposal.

We get research funding. That's how our research program starts. But a spark of imagination isn't enough.

How do you develop such ideas?

Our lab, RoMeLa, is having a great brainstorming session.

We all come together to discuss and discuss issues and social issues.

Check the rules before you start

The rule is "Don't criticize anyone's ideas.

Do not criticize any opinion

This is very important, because students can be anxious and afraid of what other people think of their opinions and ideas.

By simply following this rule, students can develop an amazing degree of freedom in generating ideas.

They've got some really cool, crazy, brilliant ideas, and it's like the whole room is filled with creative energy.

That's how ideas develop.

I'm running out of time, but there's one more thing I want to talk about.

It's not enough just to spark an idea and develop it.

You had a great talk at TED, Sir Ken Robinson.

He talked about how education and schools are killing creativity.

There are actually two sides to this

There's only so much you can do with original ideas, creativity and engineering intuition.

If you want to do more than just craft, go beyond hobby robots, and tackle really big robotics challenges based on solid research, you need something else, and that's where school comes to life.

Batman fights bad guys and has a utility belt, a grappling hook, and a variety of other props.

For us robotics researchers, engineers and scientists, the tools are the university classes and curriculum.

Math Differential Equations

Linear algebra, science, physics, and recently even chemistry and biology.

These are the tools we need

The more tools Batman has, the more effectively Batman can fight bad guys, and the more footholds we have to tackle the big problems.

education is very important

And not only that, but you have to work really hard.

I always tell my students

"Work smart and work hard." The picture in the background is the lab at 3 a.m.

If you could come to our lab at 3:00 or 4:00 a.m., I'm sure the students would still be working.

This brings us to the last point: "Don't forget to have fun."

This is the number one secret of our success. Everyone really enjoys what they do.

You're most productive when you're having fun, and that's what we do.

Thank you very much

(applause)

Thank you I have two missions today

First, I want to talk to you about pollen and make sure that you understand that pollen is not just "stinky."

And second, I want you to know that every household should have an electron microscope.

(Laughter) Pollen makes the flowers reproduce.

It carries cells from the stamens from one flower to another.

This gives us genetic diversity, or at least higher genetic diversity in plant species.

It is better not to mate between the same individuals.

This would apply to humans as well

Pollen is made from stamens

A single pod can store 100,000 pollen grains, which is very prolific.

And in addition to bright flowers, trees and grasses also have pollen.

All the grains we eat are grasses

This is pollen as seen through an electron microscope.

The little hole in the middle, which I'll talk about a little later, is for the pollen tubes, which are very small tubes, to come out later.

Now this is 20 micrometer pollen.

1/50th of a millimeter

Not all pollen looks this simple.

This is a plant called Molina. It doesn't look like much, does it?

Anyway let's see that pollen

I think it's wonderful

The little hole in the center is for the pollen tube, but what happens when the pollen finds a special place for the pistil in another Molina flower?

As I said, pollen carries stamens, or male cells.

For those of you who didn't get it, plants have free, chaotic and extremely interesting sex.

(smile)

Now, I'm not talking about plant reproduction, but pollen itself.

You might ask, what are the characteristics of pollen in the first place?

First of all, pollen is small, you know.

It's also very biologically active, as anyone with hay fever knows.

Plants that use the wind to disperse pollen, such as trees and grasses, are the cause of most hay fever.

Because such plants disperse so much pollen that some of them are lucky enough to end up on other individuals of their own species.

Let me give you a few examples. If you look at the pictures, you can see that the pollen is very smooth and easily carried by the wind.

This is a wind-spreading plant called a sycamore.

It's a tree, and it has very dull flowers, because it's not trying to attract insects.

but pollen is cool

this is my favorite

It's made from the pollen of the Monterrey pine, and it comes with a little air-filled bag that allows it to disperse the pollen farther.

You see, this is all about just 30 micrometers.

Now, if we could use insects for pollination, it would be much more efficient.

This is the leg of a bee, with the pollen attached to it from the hollyhock flower.

And this is a mangrove palm flower, whimsical and beautiful.

It's very flashy, isn't it, to attract insects?

If you look closely, pollen has small protrusions.

It's these little bumps that allow insects to stick so well, but there's something else you can see in this picture, and you can see the cracks in the pollen, which is the equator of the Earth's analogy.

This tells us that this pollen was fossilized.

And to our great pleasure, this pollen was found very close to London, which means that 5,500 years ago, London was full of mangrove pines.

I envy you

(Laughter) This is another plant that evolved into an insect pollinator.

You can tell by looking at the little bump

All of these pictures were taken with an electron microscope in the lab at Kew National Botanical Gardens.

It's no coincidence that this photograph was taken by artist Rob Kessler, and it's no coincidence that someone with an artistic eye like him can bring out the beauty of pollen.

(Laughter) Now, the fact that pollen is so diverse means that just by looking at a single pollen grain, you can tell what kind of plant it is.

Different kinds of plants grow in different places, and some pollen particles travel farther than others.

If you have a sample of pollen, in principle, you should be able to tell where it came from.

In this regard, pollen is interesting for forensics.

Pollen is small and sticks to things

Not only do different pollen grains look different, but different combinations of plants live in different places.

A pollen signature, or maybe a pollen fingerprint.

So by looking at the mix and proportion of pollen in a sample, we can tell very precisely where it came from.

This is pollen on a cotton shirt, like the one I'm wearing right now.

Most of the pollen will stick around, no matter how many times you wash it.

Where did you come from?

These four different locations all look the same, but the pollen has very different characteristics.

Actually, this is a particularly easy case, and all these pictures were taken in different countries.

Forensic analysis using pollen is very precise.

Now we're investigating and finding out where counterfeit medicines were made using pollen, where the money came from, where the antiques came from, and the perpetrators admitted it, so we're pretty sure.

And murder suspects can also be searched using their clothing to pinpoint regions within the UK to areas where police dogs can find victims.

You can narrow it down to within a kilometer of a piece of clothing, and you can find out where that piece of clothing has been recently, and you can send in a police dog.

And finally, in a very tragic event, during the Bosnian War, a court found that the pollen facts were evidence that the bodies had been buried, exhumed, and reburied in a different location.

I hope that I have opened your eyes to pollen and given you a new perspective, like this picture.

This was horse chestnut pollen.

There's beauty all around us that we can't see, and every pollen grain tells a story.

Just as each of us has a story, like our fingerprints, they speak for us.

Thank you to my colleagues at Kew National Botanic Gardens and to all the palynologists around the world.

(applause)

(Music) I am 300 and 72 years old and I miss them with deep regret I picked up the cute little boys I met and ate them greedily I ate the boys in their sunny day outfits raw I made curry and ate them with rice I ate them roasted whole with their jackets and boots Very tasty boys Little boys don't like to be chomped (music) So now I'm putting up with the eels Don't do anything wrong I'll have to explain this innocent nap to get through the rest of the time I'm not eating (Applause)

I've been putting children's poetry to music for the last six years.

This is a poem by Charles Edward Carrill, who worked as a trader in New York City for 45 years, but at night he wrote strange tales for his children.

This book was one of the most famous books in America for about 35 years.

The "Sleeping Giant" I sang earlier is one of his poems.

Now, I'd like to sing another poem, and I'd like to introduce you to another poet.

This is Rachel Field, Robert Graves, in his youth, Christina Rosetti.

You think they're ghosts?

We have nothing to complain about - outdated - forgotten - but that's not the case.

What I enjoy about this project is bringing these people's words back to life.

To pick them up from the dead flat page—

to revive and shed light

So next, I'd like to play a poem written by Natalia Crane.

Natalia Crane was a girl from Brooklyn.

In 1927, at the age of 10, she published her first collection of poems, The Gatekeeper's Son.

this is her

and here is her poem

(music) Oh I'm in love with the gatekeeper's son The gatekeeper's son is in love with me Oh I'm in love with the gatekeeper's son The gatekeeper's son is in love with me He's going to find a deserted island near us A deserted island with fragrant trees Somewhere in Sheepshed Bay Just the right place for two A perfect and lovely place We can always live together Oh I'm in love with the gatekeeper's son The gatekeeper's son is very busy Underground he's building a raft out of an old couch He'll take me away I know 'cause his hair is so red And I'm thinking he must be well-behaved and shivering in bed On the day we paddle I'll write you a short note lest my parents should be in trouble "I'm running away to an island in the cove with the red-haired gatekeeper's son" Gate Red-haired son of the guard Red-haired son of the gatekeeper Red-haired son of the gatekeeper Red-haired son of the gatekeeper I'm going on a boat trip to Sheepshed Bay With the red-haired son of the gatekeeper On an old couch With my red-haired boyfriend Redheaded son of the gatekeeper Redheaded son of the gatekeeper Redheaded son of the gatekeeper Redheaded son of the gatekeeper Redheaded son of the gatekeeper (Applause) The following poem is E.E. It's from Mings, "Maggie and Millie and Molly and May."

(Music) Maggie and Milly Molly and May One day I went to the beach to play Maggie found a singing shell With a voice so sweet I forgot all my troubles Maggie and Milly Molly and May Maggie and Milly Molly and May Milly was left alone and made friends with a starfish The light was that light The five fingers of a starfish starfish that died (Music) Maggie and Milly Molly and May Maggie and Maggie Millie Molly and May (music) Molly was chased by something terrifying Growing down the pavement Growing at something running Mei groaning Mei brought back a smooth round stone As small as the world As big as a loner (music) Even if we lose you or me We'll always find ourselves at sea (Applause) Thank you

(Applause) The next verse is "If no one ever married me."

This is from Lawrence Alma-Tadema

She was the daughter of a very, very famous Dutch painter who made a name for herself in England.

After the artist lost his wife to chickenpox, he moved to England to raise two young children.

One of them was my daughter, Lawrence.

She wrote this poem when she was 18, in 1888. To me, it looks like a pretty feminist manifesto, with a little bit of defiantness and a little bit of resignation and regret.

(music) If no one marry me 'Cause I don't know why they're marrying me My nanny says I'm not pretty And I'm not a very nice girl I'm not a very nice girl If no one wants to marry me I don't care I'll get a hut by my side and a pony of my own I'll take you around town A clean and gentle little lamb And when I'm really big When I'm 28 or 29 I'll buy a little orphan girl to raise as my child If no one will marry me If no one will marry me If no one will marry If no one will marry If no one will marry me, thank you.

(Applause) Thank you.

After working on it for six years, I was so intrigued by these poets that I started researching their lives, and decided to write a book about it.

The question that has been lingering about Alma-Tadema is, is she married?

The answer was no, according to the records of The Times of London.

She died in 1940, single, surrounded by books and close friends.

Gerald Manley Hopkins was a pious man.

he became a Jesuit

Converted from the Anglican Church

He was inspired by the Tract Movement or the Oxford Movement and became a Jesuit priest.

At the age of 24, he burned all his poems and did not write for the next seven years, because he could not combine his life as a poet with his life as a priest.

He died of typhoid fever at the age of 44, probably 43 or 44.

At the time he was teaching classics at Trinity College in Dublin.

A few years before his death, after he secretly resumed his poetry, he confessed in a letter to a friend that, in my research, I found out, "I wrote a poem.

It's a poem to explain death to a child--I wish it had a monophonic melody."

Reading this froze me, because 130 years after this letter was written, I actually had a monophonic melody.

The title of the poem is "Spring and Autumn"

Margaret, you're grieving As the golden grove sheds its leaves little by little You cherish the leaves with the same lively thought as you do But as your heart grows older it grows colder Little by little without a sigh A world of decaying trees and decaying leaves But you'll shed tears And you'll know why It'll be alright That name, the spring of sorrow is also the same And the same mouth and head never said it Well, ghosts know what the heart hears Humans were born under that dark shadow That's why you mourn Margaret Thank you very much

(Applause) (Music) Thank you, scientists, philosophers, architects, inventors, biologists, botanists, artists...

Everyone who overwhelmed me this past week

thank you

(Applause) Oh la la la la la la la la... (Applause) La la la la la la la la la la la la la la la la la la la la la la la la la la You were so kind and generous You gave so much I am indebted for your kindness I respect you for your selflessness I owe you everything you have done I owe you I must thank you la la la la la la la la la... (Applause) la la la la la la la la La la la la la la la la la la la la la la la la la la And you're so kind

(Laughter) Now it's my turn to speak.

there are still two minutes left

(Laughter) Okay, I'll repeat that line one more time.

You're so kind... don't you think this is revolutionary?

I've got to get the crowd down, but I'm like, "Okay, shhh." (Laughter) You're so kind... I think I'll dedicate this song to Bill Gates. (Laughter) I admire him so much.

You were so kind and generous You gave so much I'm so grateful for your kindness I couldn't have made it this far without you I owe you everything you've done I have to say thank you to you thank you thank you thank you thank you thank you thank you thank you thank you thank you thank you thank you thank you thank you thank you thank you thank you thank you thank you thank you thank you thank you thank you thank you thank you

(Laughter) (Applause) I want to thank you Thank you Thank you Thank you Thank you Thank you Thank you I want to thank you Thank you Wouldn't this be better?

I want to thank you Thank you I want to thank you Ooh hoo Ooh hoo Ooh hoo Ooh hoo Turn the volume down

decrescendo

Make it weaker, make it weaker little by little

I want to thank you, thank you, snap my fingers and it's not over yet

Thank you very much

(applause)

Let's say we have a machine here

It's a big, cool, TED-like machine, and it's a time machine.

I want everyone here to ride.

You can go to the past or the future, but you can't stay in the present.

where are you going? When I ask a lot of my friends this question these days, they all say they want to go back in time.

For some reason, I want to go back to a time when there were no cars, no Twitter, no American Idol.

I wonder why

Is there something that makes you feel nostalgic or something like that?

but, I

I have to say that I am different from those people.

I don't want to go back to the past, not because I'm adventurous.

We're not going backwards, we're moving forward -- because we believe in the potential of this planet.

That's why I want to move forward with a time machine

Now is the best time on this planet ever, no matter what criteria you choose: health, wealth, freedom of movement, chance, and less disease.

There is no other time like this

All my great-grandfather's generation died by the age of 60.

Grandfather generation extended to 70 years old

my parents are approaching 80

It is possible that my life expectancy will reach the 90 mark.

But there are others who are far more affected than us.

A child born in New Delhi today will live as long as the richest man in the world 100 years ago.

think about it, it's unbelievable

how did it happen

Smallpox. Billions of people on this planet have died from smallpox.

It affected the population far more than the number of people lost in any war.

But it's gone, it's gone

we repressed

In rich countries, the diseases that threatened the lives of millions a generation ago are almost gone.

diphtheria, rubella and polio

Do you know what this is about?

Vaccines, modern medicine, the ability to feed billions of people, these are the triumphs of the scientific method.

I think the scientific method is to try something, see if it works, and if it doesn't work, change it.

this was a good story

Unfortunately, that's the end of the good story. Now there's a problem, a problem that's been talked about for years.

One of the problems is that even with all this progress, one billion people in the world go hungry every day.

It is a very unfortunate situation that the number is increasing rapidly.

Not only that, our wisdom is about to destroy the planet.

Drinking water, arable land, rainforests, oil, natural gas, it's all going to run out.

Can you find a way? That's the question. I think it's possible.

We believe we can produce food for billions without damaging the land.

We believe we can provide energy without destroying the world.

Not wishful thinking, I truly believe

But sometimes I can't sleep at night because I worry about things like this.

Even though the results can be most appropriately implemented,

In many fields, we have an astonishing, truly astounding thing to happen. You have to go back 300 years to the time before the Enlightenment to find a time when you were resisting progress, when you were more actively resisting progress on many fronts than you are now.

People are clinging to their own notions, clinging to the point of no control.

Even the truth cannot change

Look, everybody can have their own opinion, they can have their own opinion about progress.

What are you not allowed to do?

We're not allowed to find our own facts, sorry, but no.

it took me a while to understand

Ten years ago, I wrote a short article on vaccines for The New Yorker.

I was surprised by the counter-argument. What was being counter-argued was, in short, against the best health policy in human history.

I was at a loss, so as usual, I wrote the article and moved on to the next job.

Shortly after that, I wrote an article about genetically modified food.

This time it was the same, but there was a bigger response.

it was a crazy reaction

I even wrote about this reaction. I didn't understand why some people called it "Frankenfood." I didn't understand why intentional modification of a molecule, as opposed to naturally occurring modification, would be considered a violation of the realm of nature.

But as usual, I write an article, and then I move on to the next article.

'Cause I'm a journalist

Write your manuscript, submit it, go out to dinner, okay?

(Laughter) Still, this experience haunted me, and I didn't know why, but eventually I did.

The fanatics who seemed troublesome weren't fanatical at all.

They were thoughtful people, educated and decent people.

Exactly like everyone here

i was really confused

Then I thought, come on, let's be honest

In this world, the relationship between progress and us is changing.

Opinions about progress have become conflicting

It's now in square brackets, with an ironic nuance: "progress."

OK, as you all know, there's a reason for that.

We've lost trust in institutions and authorities, and sometimes science itself has lost trust, and I don't think it should have.

Concrete examples that everyone will agree with will come up soon.

Withdrawal of Chernobyl, Bhopal, Challenger Vioxx and inadequate 'weapons of mass destruction' ballots

Anyone can make a list like this

We're finding problems and challenges where we've always thought they were right.

Ask questions, ask for proof and evidence

Nothing is accepted as is

The problem is, when the proof comes, you have to accept it, and it's not that easy.

How can I say that? The plague of terror is spreading like never before, like we never want to see it again.

Twelve years ago, this story became widely known, and it's a terrifying story about how vaccination against measles, mumps, and rubella spreads autism like a plague.

very scary

A lot of research has been done to uncover the truth

A lot of research should have been done, because it's a serious problem.

got the data

From the US to the UK to Sweden to Canada they all had the same result No correlation No causation None at all

No problem, no problem at all, but we believe the episodes.

I can't believe the documents with the data provided by the government officials, and I'm sure you do.

and what happens

Dire consequences await

The tragic fact is that America is the only country in the world where measles vaccination rates are declining.

It's a shame and a shame

it's horrible

What would happen if this happened?

this is what i understand

Are there any measles patients here?

Do you know anyone who died from the measles?

it is very rare

It doesn't happen in this country, but it happened on Earth 160,000 times last year.

A lot of lives are lost to Mashika, 20 people an hour.

It's just that it's not happening around us, so we don't care. People like Jenny McCarthy are all over the place using talk shows and other venues to promote their messages of fear and ignorance.

They can do that because they don't distinguish between causation and correlation.

They don't realize that these two seemingly similar things are almost completely different.

This difference is important, and we need to know it as soon as possible.

Introducing our hero, Jonas Salk.

The man who eradicated one of humanity's worst plagues.

The fear and anguish of polio vanished together.

Not as good as him, but the man in the middle

Paul Offitto in collaboration with many

Developed a rotavirus vaccine

It saves the lives of 400,000 to 500,000 children each year in developing countries.

would be great

Except Paul talks about vaccines all over the place...he talks about how it's worth it and says stop blaming vaccines.

that's how you say it

That's why Paul is called a terrorist.

When Paul speaks at the hearing, he can't speak without armed bodyguards.

They call home and threaten to know where your child goes to school.

why? because paul made the vaccine

Needless to say, vaccines are essential

If you lose this, the disease will come back, and the terrible disease is actually happening.

Now the measles have returned to the country.

Things are going from bad to worse, and soon there will be child deaths from Mash, and the numbers are telling.

It's not just a hashika problem

How about polio, shall we take this up?

I got a letter a few weeks ago from a college classmate who said that I was a bit of an eyesore.

It's the first time I've been told that

They say they're not going to vaccinate their children against polio, no way.

okay

why? Because polio doesn't exist, okay?

There was no polio in the country until yesterday.

Today is? I don't know the guy who's flying out of Lagos this morning to Los Angeles or Ohio.

In a few hours' time I'll be in the country, pick up a car, and maybe head to Long Beach for a fancy TED dinner tonight.

We don't even know we're infected with that paralytic disease, neither do we, that's how the world is.

We live on such a planet, please don't pretend you don't know

We like to be wrapped up in lies, we like it

Has anyone taken vitamins this morning?

Who is cheering up with the antioxidant Echinacea?

Half of Americans drink it every day, so it's normal.

I take supplements like this to practice alternative medicine, and I won't stop no matter how many times I see that it doesn't work.

You can always find out by looking at the data

It colors the urine and does nothing else.

(Laughter) No problem, you want to pay $28 billion for dark urine.

Isn't it fine

(Laughter) My urine is dark.

What was it for? Why did you do that?

I understand, of course, because I don't like big pharmaceutical companies.

I hate big governments, I don't believe in them.

don't trust the health insurance system is terrible

It's a system that turns millions of people away.

It's just an astonishingly cold system, and even those who can afford it don't care.

let's stay away where should i run

Believe in the placebo effect

(Laughter) Great placebo hooray.

(Applause) No, I'm not kidding. Billions of dollars in junk supplements.

We have a variety of supplements here

Ginkgo biloba — imitation Echinacea — imitation Akai — what is it anyway? We're spending tens of billions of dollars on this crap.

And then, when I say this, people criticize me, "What's wrong with you? Let me do what I want.

Because that's what I want to do."

ok you're wrong

I don't mind if the Secretary of Health and Human Services says, "I'm not going to take the expert opinion on mammography," and if a semi-savvy person wants to cure cancer with a coffee enema, it's none of my business.

Advancing into a world where belief and magic take precedence over evidence and science can lead to unwanted consequences.

Be like Thabo Mbeki from South Africa

He killed 400,000 of his people by claiming that beet ginger and lemon juice were far more effective than antiretroviral drugs known to slow the progression of AIDS.

It has spread AIDS worse than any other country, causing hundreds of thousands of people to die needlessly.

Please don't say it has nothing to do with this.

it has a lot to do with

In fact, there's an absurdity going on right now, and it's a battle between the proponents of genetically engineered crops and those who stick to organic farming.

It's a silly debate and we have to end it now.

It's a controversy over verbiage and parables.

ideology, not science

Everything we eat is man-made, from a grain of rice to a bunch of parsley to a brussels sprout.

There were no tangerines in the Garden of Eden

There were no melons, there were no Christmas trees, they were all made.

I made it in the past 11,000 years.

What went well and what didn't

The things that don't work are gone

And now we have a much more sophisticated method. Of course, there are risks, but we can still introduce things like vitamin A into rice, and it's going to save millions of people.

you don't want to do this

I have to say that I don't understand

oppose genetically modified crops

I wonder why

The explanation I hear all the time is that there are too many chemicals, pesticides and hormones, that it's not good to grow a single crop on a huge field, that it's wrong.

Because I don't want the patent of life to be held by some company

Because I don't want the company to control my seeds

I always answer

You're right, let's fix that.

It's true that we have a big problem with food, but this is not science.

It has nothing to do with science

It's a matter of law, ethics and patents.

Science is different from business

different from national

Ideas are different

Science is a methodology. Sometimes it works, sometimes it doesn't. But the idea that we shouldn't allow the scientific approach because it worries us is the most mind-stopping thing. It's preventing millions of people from being happy.

In the next 50 years, we're going to have to produce 70% more food than we do now, 70%.

See the last 30 years of investments in Africa

It's a disgrace It's a disgrace

they need it but we don't give it

why is it genetically modified

I don't want to encourage people to eat something as bad as cassava.

About 500 million people eat cassava

Somewhat similar to potatoes

It's just calorie food. It's terrible.

No nutrients, no protein Scientists are trying to genetically modify it to have nutrients and proteins.

Then just eat this and you won't go blind

you won't starve

It's a wonderful thing. It's not on the menus of famous restaurants, but it's okay.

What I want to ask is why are you resisting this?

ask yourself why you resist

Because you don't want to move the gene?

It's about gene transfer, not chemicals.

I'm not talking about hormones that are making a fuss. I'm not talking about wanting bigger, better, more extraordinary food.

I'm not talking about cereals. I'm talking about saving lives. Now get to the bottom of it.

May I

If you don't give it a second thought and continue to act the way you've always done, you're committing an unwitting sin: high-tech colonialism.

What is happening now can only be described as

It's selfish, it's ugly, it's not what we should do, it has to stop.

So at the end of this amazingly funny story, (Laughter) you might ask, "Do you still want to go to the future in this weird time machine?"

I definitely want to go

I'm stuck right now, but I have unprecedented possibilities.

You can set the time machine to your liking

We can decide where we're going, we're going where we want to go.

Of course, it is necessary to discuss and think, but if you get on the time machine and go to the future, you should think that it was good to go.

I believe we can achieve what the world needs today.

thank you (applause)

thank you

(applause)

My industry believes that photography can change the world.

Yes, innocent and full of baseless motivation

In fact, we know that photography itself doesn't change the world, but on the other hand, what we've known since the beginning of photography is that people react to it, and that reaction makes a difference.

Let's see some pictures

You should know most of these

It's all iconic pictures.

It's so well-known that even if you show it in a slightly different way, you might still recognize it.

(Laughter) But we're looking for more than that.

something more than a symbol

We're looking for photographs that uncompromisingly shed light on important issues -- photographs that transcend borders and religions -- that make us stand up and do something, in other words, make us act.

You've seen this photo before

A photo that changed the way I looked at the natural world

I had never seen the Earth from this angle before.

There are many people who believe that the environmental movement began to flourish because they saw the Earth from this angle for the first time and realized how small and fragile it was.

Forty years later, this group realized that humans are destructive enough to change the global environment.

It seems that mankind is finally beginning to grapple with this problem.

This destructive power takes many forms.

These photos were taken by Brent Steerton in the Congo.

A gorilla has been killed and crucified, and of course there has been international condemnation.

Most recently, the devastating earthquake in Haiti reminded me of the destructive power of nature.

Even worse than this is the destructive power of humans over humans.

To quote Auschwitz survivor Samuel Peyser, "The Holocaust taught us that no matter how turbulent nature may be, it can never be as ruthless as when man loses his ethics and reason."

This is another crucifixion

Horrifying photos from Abu Ghraib Prison and Guantanamo Detention Center are deeply impactful.

The publication of these photographs, unlike the photographs themselves, has the power to change government policy.

Some say it was these photos, rather than the actual actions, that fueled the riots in Iraq.

Moreover, these photographs forever made it difficult to believe the high ethical standards of the occupying forces.

Let's go back in time for a moment

In the 1960s and 1970s, American households were bombarded with news of the Vietnam War day in and day out.

Through the photos in the news, people were confronted with the victims of war, from the girl who was burned by napalm to the student killed by the National Guard during a protest at Kent State University.

These photos actually became the protest itself.

Photography has the power to shed light on suspicion and ignorance, and in particular -- out of so many, let me show you another one: AIDS.

In the 1980s, people's accusations of AIDS became a major obstacle to even having a conversation.

In 1987, one of the world's most famous women, Princess Diana's tiny act of touching an AIDS-infected child became a major reason to end this discrimination, especially in Europe.

she knew the power of photography

When you come across a photo that makes a strong impression on you, you have two choices: look away or face it.

Thankfully, when these photos appeared in The Guardian magazine in 1998, many people turned their attention to the problem, and a lot of money was raised for the famine in Sudan.

Did photography change the world?

The answer is no, but it made a big impact

Photography challenges our beliefs and our sense of responsibility.

It's a photo that everyone saw after Hurricane Katrina, and it must have had a strong impact on millions of people.

And I don't think this sentiment is very different from how Americans felt during the 2008 presidential election.

Unfortunately, some of the pictures that matter most are so vivid they're unbearable to look at.

I'm going to show you one picture, Eugene Richard's photograph of an Iraqi veteran -- an unpublished masterpiece -- from "Soldiers' War."

But photographs don't have to be sharp to convey the tragedy of war.

A photo taken by John Moore at Arlington National Cemetery

After feeling the tense atmosphere of conflict zones around the world, the pictures from the quieter places touch me more than any other.

I don't think Ansel Adams was wrong when he said, "Photographers don't take pictures -- they make them."

I think it's you who makes the picture, not the photographer.

When you layer your own values ​​and thoughts on each photo, the photo will respond to it.

My company has 70 million photos

I have one in my office

Here it is

Today, I am convinced that the next time you see a photograph that speaks to you, you will better understand why and take action.

Thank you to all the photographers who contributed

(applause)

ok i'm a geek

We're obsessed with eating organic foods, minimizing our carbon footprint, and robotic surgery.

I really want to build something that's good for the planet, but I always find it very questionable to explain how to do it, because it's always based on good intentions, but it's so focused on moral reasons and so light on data.

so you have to think for yourself

For example, is this a bad thing?

Made from happy self-actualized local cows -- I dropped a bit of organic yogurt on the countertop, but I want to grab a paper towel and wipe it off.

Can I use paper towels? (Laughter) The answer lies in embodied energy.

It took to make paper towels -- energy and water. Virtually every time you use paper towels, you're using this much water and energy.

Wipe it off and throw it away

In contrast, a cotton towel that can be used 1,000 times -- has a relatively low amount of embodied energy until you wash the yogurt-soaked towel.

This shows the operational energy

When you put your towels in the washing machine, you're wasting energy and water on the towels.

A front-loading energy-saving washing machine would be a little better.

How about half that size recycled paper towels?

A paper towel would be better

Paper towels aside What about sponges?

After wiping it with a sponge and exposing it to running water, the energy plummeted and the water plummeted.

But if you're like me and you open the faucet with "hot water," your energy starts to increase.

Furthermore, if you leave the towel running until it warms up before washing it,

it's already ruined

(Laughter) And that means that sometimes, unexpected things, like the location of the faucet, have a bigger impact than anything you're trying to optimize.

Now let's say a freak like me is trying to build a house.

(Laughter) Right now, my husband and I are building a house, and I'm not sure how eco-friendly it can be.

i wanted to know

There are many articles out there that explain the trade-offs in eco practices.

It tends to recommend optimizing small things and miss important issues.

The average house contains 300 megawatt-hours of embodied energy -- the energy you expend in building it -- enough to make millions of paper towels.

I wanted to know how much this could be improved.

Like most people, it starts with a house on the lot, and the top numbers are for typical architecture, and the bottom numbers are for our home.

demolish the house first

It takes energy, but you can get some energy back by taking it apart and taking it apart and reusing the leftovers.

Then I dug a big hole and installed a rainwater tank to store water independently for my garden.

Then we built a big foundation for simple harnessing of solar heat.

Concrete with a high fly ash content can reduce the amount of contained energy by about 25 percent.

Then I built the skeleton

Because this framework is made of wood or composites, it's difficult to return the contained energy, but FSC-certified wood is an environmentally friendly resource.

I was really surprised for the first time in this construction.

The use of aluminum windows, by itself, doubles the energy consumption.

PVC is a little better, but not as good as the wood we chose.

Then we install the plumbing, the electrical system, the air conditioning system, and then we install the insulation.

Foam insulation is very efficient and fills all the gaps, but the energy content is so high that blasting it with cellulose or jeans fibers saves a lot of energy.

I used bundles of straw to fill the study room, and the energy contained in straw is zero.

If you use EcoRock for a gypsum board, the energy contained in it will be one-fourth that of a typical gypsum board.

Now it's time to finish. It's often featured in the "green" articles, but on the scale of a house, it has little impact.

Yet the media attaches great importance

except for the floor

Carpet takes up about a tenth of the embodied energy of a house, but replacing it with concrete or wood significantly reduces the embodied energy.

Add the rest of the building energy and add up, and the embodied energy of our home is less than half that of a similar house built normally.

But before you start to brag about yourself, think about it, we already had a house, and we spent 151 megawatt hours building this house.

So the question is, how do we get it back?

If you compare your new energy-efficient home to your old, energy-efficient home for the rest of your life, it will pay for itself in six years.

But retrofitting an old house to make it more energy efficient will take about 20 years to pay for itself.

Without taking into account the embodied energy, it would take more than 50 years to pay for itself compared to a retrofitted house.

What does this mean?

For a car the size of our house, that's about the same amount of energy we use in a year to drive, and about five times as much as going completely vegetarian.

But getting on a plane is a problem.

You obviously have to walk home from TED

I have a calculation of the embodied energy on my blog.

And remember, sometimes it's the unexpected that makes the most impact.

Thank you. (Applause)

It's been 22 years since I started turning my back on violent extremism, out of the American white supremacist skinhead movement that denounced racism and helped to start it.

(Applause) I was only 22 at the time, but I was 14 when I was one of the earliest and youngest members of America's most violent hate movement, and by that time, eight years had already passed and I had already ascended to leadership.

But I wasn't born into that kind of family.

I had a relatively normal childhood

Her parents, Italian immigrants, came to America in the mid-1960s and settled on Chicago's South Side, where they met and opened a small beauty salon.

Life got tough when I was born

It was not uncommon for the two of them to take a week off and work 14-hour days, working two or three jobs just to make a little living expenses.

So it's fair to say that he didn't have a lot of fun with his parents.

I knew I was loved so much, but as I grew up, I felt abandoned.

I felt lonely and withdrawn, angry with my parents and raging with anger.

And then when I grew up and became a teenager, I groped for the attention of my parents.

And then one day, when I was 14, I was standing in a back alley smoking a marijuana cigarette when a skinheaded guy about my age in black high boots came up to me and snatched the marijuana cigarette out of my mouth.

Then he put his hand on my shoulder, looked me in the eye, and said, "This is what the communists and the Jews want to keep you obedient to."

I was 14, trading baseball cards and watching "Happy Days," and I didn't even know what a Jew was.

(Laughter) It's true.

And the only communist I knew was that bad Russian guy from my favorite Rocky movie.

(Laughter) Today, I'm going to let you all know that I didn't even know what the word "obedience" meant.

(Laughter) It's true.

But it felt like the man I met in that alley gave me a lifeline.

For 14 years, I felt excluded and bullied.

I didn't have confidence in myself

To be honest, I didn't know who I was, where I belonged, or what I was aiming for.

I lost myself

And then, with all my heart, I grabbed the "lifeline" that the man who recruited me offered me, and overnight I went from being a boy watching romance dramas to being a real Nazi.

in one night

I heard a Nazi speech and believed it.

I also began to see first-hand how the leaders of this organization target impressionable young people who feel alienated, with the promise of paradise, to bring them in, and then break that promise.

And I myself began to solicit

It was a way of making white power music.

And soon I was head of an infamous organization led by the man who recruited me on that back street that day, America's first neo-Nazi skinhead, and the man who radicalized me.

Eight years later, I believed the lies I was told

And he did not hesitate to accuse Jews all over the world of believing, without any justification, that white genocide was taking place in Europe, and of promoting it with his multicultural policies.

And while he accused people of color of being at the root of street crime, violence, and drugs, he completely dismissed the fact that he was the one who was committing acts of violence on a daily basis, and that white supremacists, in many cases, were the ones who brought drugs into the city.

And I accused immigrants of taking jobs away from white Americans, while completely ignoring the fact that my parents were trying to get by without anyone's support -- hardworking immigrants.

In the eight years that followed, some of my friends died, some went to prison, and it caused immeasurable pain in the lives of countless victims and their families.

I've heard horrifying stories from young women in the movement who have been brutally raped by men they told them they should trust.

I was stockpiling weapons for the racial war I thought was coming.

I went to high school six times, four of which I was expelled from, one of which was twice.

And 25 years ago, I wrote and performed a racist song that later, in the Internet age, inspired a white patriotic young man to break into a sacred church in Charleston, South Carolina, and indiscriminately murder nine innocent people.

But one day my life changed

When I was 19, I met a young woman who wasn't in the movement, who didn't have the slightest hint of racism, and we fell in love.

And when I was 19, I got married and had my first son.

When I held my son in my arms that day in the delivery room, not only did I regain a little bit of the innocence I lost when I was 14, but I began to question the very important things that drew me to the movement in the first place: identity, community and purpose in life, the things that haunted me as a boy.

I began to struggle again with the question of who I was.

Am I a neo-Nazi agitator or a loving father and husband?

Do I belong to a community I built around myself in an effort to raise my self-esteem because I wanted to project the disgust I felt upon others, or did I belong to a community I gave life to with my own body?

Is my purpose to burn the earth down, or to make it better for my family?

And suddenly, as if I had been punched in the head, I began to feel very confused about the past eight years of myself.

If, at this point, I had the courage to step out of the situation, the courage to understand the conflict that was going on inside me, perhaps the tragedy could have been prevented.

instead i compromised

I stopped being on the streets for my family's sake, because I was afraid that if I went to jail or died, I would be leaving my family behind.

So I stepped down from being a leader and opened a record store to sell, of course, white power music, which I imported from Europe.

But I knew the community wouldn't tolerate a racist store that only sold racist music.

I decided to include other music as well: punk rock, heavy metal, hip-hop.

Sales of white power music accounted for 75 percent of total sales, and because it was the only store that sold white power music, buyers came from all over the country, while others came to buy other types of music.

Gradually I became able to speak

One day a black teenage boy came in and was visibly upset.

I decided to ask what happened

He told me that his mother had been diagnosed with breast cancer.

I didn't have much conversation or interaction with this young black boy, but all of a sudden, I felt a connection with him, because my mom had breast cancer, too, and I could understand his pain.

I've had gay couples come with their children, and there's no denying that they love their sons as much as I love them dearly.

And suddenly I couldn't justify or excuse the prejudices I had in my head.

I stopped selling white power music because I was embarrassed to sell it in front of my new friends.

So, of course, the store couldn't sustain itself, so it had to close.

And at the same time, I lost almost everything in my life.

I used this as an opportunity to step out of the movement that I had devoted myself to for eight years, the only identity, community and life purpose I knew so well.

i have no one

I lost my livelihood because I closed my shop.

I didn't have a very good relationship with my parents.

And my wife and kids left because it was too late to wash my feet from exercise.

And suddenly I didn't know who I was, where I belonged, or what my purpose in life was.

I was miserable inside. I often woke up in the morning wishing I hadn't woken up.

About five years later, one of my few friends came to see me, worried about my condition, and said, "I have to do something. I don't want to see you die."

And he encouraged me to apply for a job at his company, a company called IBM.

I doubted her sanity

(Laughter) I'm a recluse, an ex-Nazi with hate tattoos.

didn't go to college

I've been kicked out of many high schools many times.

i don't even have a computer

But I applied, and somehow, miraculously, I got the job.

I was thrilled

But I was immediately terrified because I knew I was going to be sent to my old high school, the high school I had dropped out of twice, to install a computer.

Once at that high school, I committed acts of violence against students and facilities, protesting in front of the school to advocate for the betterment of whites, and even staged a sit-in at the cafeteria, demanding the establishment of a white student union.

So it must have been a well-deserved retribution. Within hours of my arrival, I passed by none other than Mr. Johnny Holmes, the burly black security guard who had once gotten me into a fistfight.

He didn't recognize me, but I saw him and I was frozen, not knowing what to do.

It's been many years since I stopped exercising, and I'm already an adult.

But I thought I had to do something

And I decided that I should bear the weight of my past and suffer because I had been trying to escape the weight for five years.

I wore long sleeves to hide my tattoos in an attempt to make new friends, and I didn't acknowledge my past because I was afraid people would judge me the way I used to.

Well, that day I decided to follow Mr. Holmes down to the parking lot, which may not have been a very wise decision.

(Laughter) When I found him, he was getting into the car, and I tapped him on the shoulder.

When he turned around and realized who I was, he backed away in fear.

I was speechless

The only word that finally came out of my mouth was "I'm sorry"

and he hugged me and forgave me

I was told to forgive myself

To him, this isn't just about a young man with no dreams, no hope, nowhere to go, who joins a gang and ends up in jail.

I knew it was the story of all impressionable young people, searching for identity, belonging, purpose in life, hitting a wall, finding no answers, and heading down a dark path.

And he asked me to promise one thing: to tell my story to whoever would listen.

That was 18 years ago, and I've been doing it ever since.

(Applause) Some of you may be wondering, how did a good kid from a hardworking immigrant family go down such a dark path?

In a word, it was a "hole"

That's right, it's a "pothole" on the side of the road.

When I was a kid, I tripped over a lot of potholes.

We all have this in our lives, but in the end, we just naturally stray from our own path. If it's left unresolved, untreated, and left untreated, sometimes we get down a very dark road and get lost in a dangerous way.

A "hole" can be trauma, abuse, unemployment, neglect, untreated mental illness, or even privilege.

And if in life's journey one stumbles over many potholes and there is no means or help to get around them or pull them out, good people can do bad things.

One such person is Darrell.

Darrell is from Upstate New York

I read my autobiography and was very upset by the ending.

Because I was out of the movement and he was still in it.

I got an email saying, "I didn't like the ending."

I said "Okay sorry"

(Laughter) "But if you want to talk about this, by all means."

Then, after a few weeks of dealing with Darrell, I learned that he was a 31-year-old wounded veteran who was so upset that he couldn't go to Afghanistan to kill Muslims.

I got a phone call one day, and when I saw a Muslim man kneeling in prayer in a park, he told me that he wanted to kick me in the face.

I flew to Buffalo the next day, sat down with Darrell, and said, "Have you ever met a Muslim before?"

He said "No!

I don't want to do that

They're devils, I don't want anything to do with them."

i said i got it

I got up and went to the bathroom.In the bathroom, I pulled out my phone and googled the local mosque.And from the bathroom I secretly called,"Excuse me, Guru, I have a favor to ask of you.

A Christian person really wants to learn about your religion."

(laughs) "Can I ask you a question?"

After a little bit of persuading Darrell, I finally took him to a mosque, knocked on the door, and the guru said he only had 15 minutes, because he was preparing for a prayer service.

I say no

We went in, and by the time we came out two and a half hours later, we were hugging each other and crying, and in a very strange way, for some reason, we hit it off at Chuck Norris.

(Laughter) I don't know what it was, but it happened.

And the good news is that Darrell and Guru now often have lunch together at the local falafel stand.

(Applause) Yes, the problem is disconnection from each other.

hate is born out of ignorance

"Fear" is the father and "loneliness" is the mother

We tend to fear what we don't understand, and if we continue to avoid it, fear can grow and turn into hatred.

Since leaving the movement, I've helped more than 100 people leave extremist movements and white supremacist organizations. (Applause) Even jihadist organizations.

My way is not to argue, I'm not to debate, I'm not to tell you that you're wrong, although sometimes I really want to.

But I don't

Instead, don't let them go

I'll get closer to them, and I'll listen to them talk about their 'hole' and then I'll fill that hole.

I work to help people become more resilient, more confident, and develop their marketable skills, so they don't have to blame strangers they've never met.

Finally, there is one more thing I would like to tell you.

Everyone I've helped will say the same thing.

First, they became extremists because they wanted a place to belong, not because of their creed or dogma.

The next thing that got me out of there was compassion, from the person I was most unfit for, at a time when I least deserved it.

(Applause) I'd like to finish by giving you a challenge. Today, tomorrow, preferably every day, go out and find people who don't think they deserve your attention, and give it to them, because they're the ones who most definitely need it.

thank you

(applause)

For a long time, I've wondered what it means to be "stunned."

The last two days have stunned me, and I've been very impressed. You are the rising stars of science and technology, not only of America.

Today, I'm here on behalf of my comrades. I would like to make a request for insects and small animals that count 10 to the 18th power, or 100 quintillion.

If we wiped all insects off the face of the earth -- as humans are trying so hard -- all remaining life would be wiped off the planet, including humans.

also in a few months

Let me give you some background on how I came to advocate this theory.

Throughout my childhood and teenage years, I became more and more fascinated by biodiversity.

Butterflies, snakes, birds, fish, caves, and finally to the definite ant age.

When I was in college, I devoted myself to antology.

In the light of such extensive research, concerns and ambitions were born, and the requests I'm about to share with you have taken shape.

I've lived a life devoted to biology, and it all started on the Florida Peninsula, on the Gulf Coast of Alabama.

For as long as I can remember, I have been captivated by the natural beauty of the area and the rich subtropical flora and fauna that inhabit it.

One day, when I was seven years old, I was fishing, and I pulled a pinfish, which has sharp spines, too quickly and forcefully, and lost my sight in one eye.

I later found out that I also had a hearing problem, probably congenital and unable to hear high frequencies.

So in choosing a career as a nature lover -- and I never considered any other option -- I wasn't very good at birdwatching, and I couldn't make out the croaking of frogs.

So I chose ants, small enough to fit between my thumb and forefinger, and they're the backbone of our ecosystem, the swarming ants. These tiny creatures create their own worlds.

That kind of research led me to a frontier in biology that was so bizarre and rich that it was like another planet.

In fact, we live on a mostly unknown planet.

The vast majority of life on Earth is not well understood by science.

In the last 30 years, in the search for the edge of the world and technological advances, in the last 30 years, in the search for the edge of the world and technological advances, biologists have discovered a third of the known frogs and other amphibians, and now there are 5,400 new species, and there are other similar achievements.

Two species of whale Two species of serow Dozens of species of monkey New species of elephant And new species of gorilla discovered Two species of whale Two species of serow Dozens of species of monkey New species of elephant And a new species of gorilla discovered

On the other side of the scale of body size, a new species of marine bacterium called Procorolococcoli (a type of blue-green algae) will be on the final exams. It was discovered very recently in 1988, and is now known to be the most abundant organism on Earth and responsible for most of the photosynthesis in the ocean.

This bacterium wasn't discovered until recently because it's the smallest life form on Earth, and it's so small that it can't be seen with a normal light microscope.

But the ocean's ecosystem depends on these tiny little creatures.

These examples demonstrate our ignorance of life on Earth.

Let's look at fungi, mushrooms, rusts, molds, and pathogenic organisms.

60,000 known species, 1.5 million believed to exist 60,000 known, 1.5 million believed to exist

Let's take a look at the most abundant animal, the nematode.

Four-fifths of the animals on Earth are nematodes, and if you remove all solids that aren't nematodes, you'll still be able to see the outlines of the missing solids where the nematodes are.

16,000 C. elegans species discovered and studied so far 16,000 C. elegans species discovered and studied so far Nearly 1 million new nematode species may yet be discovered

The biodiversity of unknown biodiversity increases with the addition of dark matter called bacteria. The biodiversity of unknown biodiversity increases with the addition of dark matter of bacteria.

That's a fraction of the estimated 100 billion species of bacteria that exist in one gram of soil.

An estimated 4 million species of bacteria per ton of fertile soil, most of which we don't understand An estimated 4 million species of bacteria per ton of fertile soil, most of which we don't understand

What are so many bacteria doing?

no one really knows

We can only trust or speculate on the activities of other organisms in our ecosystems.We can only trust or speculate on the activities of other organisms in our ecosystems.

even though our lives depend on other organisms.

To give you a familiar example, over 500 healthy bacteria live symbiotically in your mouth and throat.

Let me introduce you to an impressive video here. I made it specially this time.

I made it specially this time, so please take a look.

The song is Billie Holiday

(Video) This is just the beginning

Viruses, pseudo-organisms, contain prophages, prophages that weave genes into and help bacteria evolve, and they're largely unknown to modern biology.

The nature of viral species remains a mystery, despite being of great importance to us.

But we also know that viruses probably have more genes than all other life, but we also know that viruses probably have more genes than all other life.

Studying microbial diversity today is like setting out on a small boat in the Pacific Ocean.

But that's changing rapidly, thanks to modern genomics technology.

We've already been able to sequence the entire genetic code of a bacterium in just over four hours.

Pretty soon you'll be able to go out in the field with your sequencer behind you, just like you're going birdwatching with binoculars, you're looking for tiny crevices where bacteria live.

What will we learn when we finally get a handle on life in the world?

From relatively large mammals, birds, frogs, and plants, to elusive insects, to small invertebrates, to the myriad invisible life forms that live symbiotically within our bodies.

The realm long thought to be bacteria has been found to fall into two broad categories: the true bacteria and the single-celled archaea.

Some serious biologists, myself included, are beginning to suspect that perhaps, really, perhaps, there are aliens among the vast unknown microbes.

A real alien from outer space

The time to come was billions of years, and it seems likely that it was around the time that life began to evolve on this planet.

What we do know is that some of the bacteria that live on Earth can adapt to hostile environments, including unimaginable temperature extremes.

We are often tempted to look at life as a whole, without distinguishing its constituent species from each other.

Every species, including the tiny procorolocochoroy, is a masterpiece of evolution.

Each species has survived for millions of years.

Each one has adapted beautifully to its habitat. Species coexist with each other to form ecosystems on which we depend, and the full picture is still hard to imagine.

We are putting ourselves at risk by destroying ecosystems and the species that support them, and, unfortunately, we are destroying them again and again without a deliberate stop.

I decided to become a conservationist in 1953, as a Harvard graduate student, when I discovered a rare ant that lived in the woodlands of Cuba.

They were truly magical ants. I went deep into the mountains where there were only a few wild forests, and I finally found them. They were truly magical ants.

And I realized that after millions of years of evolution, many of these species, and many of the rare and wonderful flora and fauna that inhabit the islands, were disappearing forever, just like the rest of the world.

That's what's happening all over the place

Human heavy tanks are doing their best to invade Earth's ancient biosphere, and the abbreviation is "HIPPO," just like the animal rhinoceros.

H is habitat destruction, including climate change caused by greenhouse gases.

I is for Invasive species, fire ants, mussels, and pathogenic bacteria and viruses, which are increasing at explosive rates around the world.

"HIPPO" The first P is Pollution

The second is unstoppable population growth.

The last O is over-harvesting, which is driven to extinction by over-hunting and over-fishing.

If we don't put a brake on the HIPPO heavy tanks, predictions based on current biodiversity research say that half of the plants and animals on the planet today will be extinct or endangered by the end of this century.

Human-induced climate change, if left unchecked, could drive a quarter of the world's species to extinction within the next 50 years.

What will we and our descendants lose if the environment continues to deteriorate? What will we and our descendants lose if the environment continues to deteriorate?

A huge amount of unknown scientific information Conservation of the environment New drugs and new products with unimaginable efficacy Conservation of the environment New drugs and new products with unimaginable efficacy All of that will be lost.

There will continue to be huge losses in wealth, security and mental health.

Sadly, my knowledge of biodiversity is incomplete, and at this rate I'm in danger of losing it all without ever having a chance to discover it.

For example, there are 200,000 known species in the United States, but only a few of them have detailed ecology, and our biological knowledge is extremely limited.

Only about 15% of species have been studied enough to determine their status.

And 20% of the 15% researched is at risk, or endangered.

This is an example from the US

In short, we're flying blind to the future of the environment.

This situation must change urgently

We need to know and understand the biosphere, and we need to manage it. We need to know and understand the biosphere, and we need to manage it.

I have to calm down before I destroy the earth

we need that knowledge

This science project will rival the size of the Human Genome Project.

Think of it as a biological lunar mission.

So today, I would like to ask the TEDs and the audience around the world.

Let's create tools together to help conserve biodiversity on our planet Together we create tools to help conserve biodiversity on our planet

We call that tool the "encyclopedia of life."

What is an "encyclopedia of life"? The concept is already in place and serious consideration has begun What is an "encyclopedia of life"? The concept is already in place and serious consideration has begun

It's an encyclopedia that exists on the Internet, contributed by thousands of scientists from all over the world.

Amateurs can also participate

Every kind of description is infinitely extensible

All information about living things on earth can be viewed by anyone from anywhere in the world All information on living things on earth can be viewed by anyone from anywhere in the world at any time

I've written about this idea before, and there are people in this room who have already given up a lot of their precious time.

The good news is that science has come a long way since I came up with this idea The good news is that science has come a long way since I came up with this idea

Science and technology have advanced

Today, it's perfectly possible to create an encyclopedia like this, regardless of the amount of information you publish Today, it's perfectly possible to create an encyclopedia like this, regardless of the amount of information you publish

Last year, some of the leading scientific institutions jointly took action to make this dream a reality Last year, some of the leading scientific institutions jointly took action to make this dream a reality.

I would like to ask for your support.

Dreams come true if we work together

This encyclopedia will quickly pay off in practical applications.

It will contribute to the transcendence of human inevitability and self-consciousness.

Roles that bring distinct benefits to humanity will change the face of biology.

And it will inspire the next generation of biologists to follow the path that I personally began 60 years ago to explore, understand and conserve life.

that's my wish thank you

I was obsessed with octopuses when I was little.

I grew up in Mobile, Alabama. Some of you may be from Mobile here. Mobile is located in a beautiful delta where five rivers meet.

Crocodiles crawl there, fish swim in abundance, snakes hang from bald cedars, and birds of all kinds.

If you're a kid with an interest in living things, it's a magical place.

River water flows from Mobile Bay into the Gulf of Mexico.

I was probably five or six years old when I first encountered a real octopus while swimming in the Gulf of Mexico.

I found a small octopus on the bottom of the sea

I reached out and grabbed the octopus and immediately fell in love with its strength and agility.

I pry my fingers open and try to go around the back of my hand

I barely had this brawler

Eventually, the octopus became docile in the palm of my hand and began to change colors in a flickering, pulsating color change.

Eventually, it tucked its legs down, curled up into a ball, and turned brown with two white stripes.

"Wow, I've never seen such a creature before!"

After staring at him for a while, I thought I had to let him go, and gently let him go.

The octopus escaped my hand and performed a feat. The moment it landed on the pebbles on the seabed, it vanished in a flash, right in front of me.

So, at the age of six, I decided to learn more about this creature.

Eventually, I got my bachelor's degree in marine biology from college and went to Hawaii to attend graduate school at the University of Hawaii.

Worked at the Waikiki Aquarium while at the University of Hawaii

There were a lot of fish tanks there, but not many invertebrate exhibits. As someone who loves boneless animals, I thought I'd bring in a nice companion.

Aquarium fish are great to watch, but they don't interact with humans.

But octopus is different

Try going to an octopus tank, especially early in the morning when there's still no one around.The octopus will get up and look at you.

And when you get close to the front of the tank, you'll notice that each octopus has its own personality.

When I came to the front of the tank, he stared at me, and he had little horns sticking out above his eyes.

I was right in front of the tank, about ten centimeters of the glass, and the octopus was sitting on a little rock, and then it left the rock and came to the front of the tank.

We glared at each other at a distance of about 15 centimeters through the glass.

We stared at each other, and the octopus reached out its tentacles, grabbed a handful of pebbles, and threw them into the running water that poured from the filtration system into the tank.

The octopus grabbed the pebble again and released it again... chi-chi-chi-chi

Then the octopus raised one arm, and so did I.

Then another one, me too, another one

I lost the arm race, because he still has six, and what I saw that day could only be described in terms of play.

Then, when I was in my third year of PhD, something funny happened that actually changed my life for the rest of my life.

In short, a man visited the aquarium and asked me and a few colleagues to go to the South Pacific and collect animals for him.

I asked you to record this investigation on video.

Alright, our movie, this is going to be interesting. We did our research, we documented it.

There's a lamp flashing in my head, wait

Can we keep doing this?

Yes, become a filmmaker! I decided

As soon as I got home from that job, not really knowing what to do, I dropped out of graduate school and put up a filmmaking banner.

was lucky

What I have learned so far has been very useful

If you're a wildlife filmmaker shooting animals in their natural environment, especially if you're shooting action, a basic knowledge of what the animals are, how they behave, how they act, etc., is very helpful.

But what octopuses really look like in the ocean, I learned during the filmmaking process, filming them, and spending long periods of time with them in their underwater homes, how they lead their normal lives.

I have been to One Tree Island in Australia before.

Evolution is obviously happening at a much faster pace on that island, and when I went there, there were at least three trees growing on the island.

Anyway, there was a tree growing right next to a beautiful coral reef.

It was a channel that tidal in and out quite violently at high tide twice a day.

It was a beautiful coral reef, with many intricate reefs and lots of life, including lots of octopuses.

As is often the case with octopuses, Australian octopuses are truly masters of disguise.

Actually, look, there's one here.

The first challenge was finding them, and it was really hard.

So we figured that if we stayed for a month and the octopuses got used to us, we'd be able to observe them without threatening them.

In the first week or so, I explored the limits of how close I could get, and every day I got closer and closer.

We measured the distance at which they became restless, moving closer and further away every few hours.

After a week, they started ignoring us.

I thought, ``It doesn't seem to be bad.''

We started living our lives as normal, watching matings, courtships and fights from really close quarters. It was an incredible experience.

The most amazing thing that I witnessed and remembered was the foraging behavior.

They have different technologies that they use to catch their prey, and one of them is using vision.

It finds a clump of coral from 3 meters away and swims to it.

I don't know if you can see the crabs, but they leap up from the ocean floor, onto clumps of coral, and then spread out their tentacles to cover the coral and find hidden crabs.

I touched the tentacles, but in the end, the crab is a dead end.

I wanted to know what was going on inside

I devised a method of observation.For the first time, I was able to observe the movement of the beak that I had heard about.

It was great

If I wanted to do a lot of films about a particular kind of creature, I'd pick something that's widely distributed.

octopuses are in every sea

some live in the deep sea

I don't know if octopuses were to blame for my desire to go to the deep sea in a submarine, but I just love the deep sea.

it's a whole new experience

If you want to get away from it all and see things you've never seen before, the perfect opportunity is to go on a submersible.

Climb into the submarine, close the hatch, twist the oxygen valve, turn on the air purifier, and off you go.

I'm coming down, my connection to the ground is broken, and my merry radio goodbye.

It's quiet outside as the submarine descends

the silence spreads

It's the beginning of a good time

As you dive deeper, the blueness of the water gets deeper and darker.

Eventually it becomes a deep lavender color, and after diving about 600m it becomes jet black.

This is the area of ​​the mid-deep sea.

There's plenty to talk about just about the creatures of the mid-deep sea.

As far as I know, without a doubt, suffice it to say that there are some of the most bizarre-shaped, outrageous-behaving creatures in the mid-deep ocean.

This area covers 95% of the ocean, so let's just skim past it and descend to the Mid-Ocean Ridge, which is even more amazing.

The Mid-Ocean Ridge is a vast undersea mountain range that stretches 640,000 km and undulates across the Earth's ocean floor.

Ridges are huge mountain ranges that can be hundreds or thousands of meters high, and when they reach the surface of the ocean, they form islands like the Hawaiian archipelago.

The tops of these mountains are wide open, creating a rift valley.

This rift valley is the site of activity, because there are literally thousands of active volcanoes 60,000 kilometers long, erupting constantly.

As the continental plates move, magma rises to fill the gaps, and you can witness a new seafloor forming before your very eyes.

The 3,000 to 4,000 meters of water above the rift valley exerts tremendous pressure and tries to push the water to the center of the earth. When the water hits the magma chamber, it is heated to such high temperatures that it becomes supersaturated with minerals, and is forced back near the seafloor and erupts like a geyser in Yellowstone.

In fact, this whole area is like Yellowstone National Park decorated.

The spouting hot water reaches 300 to 400 degrees Celsius

The sea water around here is almost freezing temperature.

Due to the rapid cooling, the dissolved minerals are precipitated and the solidified minerals form black smoke.

Forms tower- or chimney-like vents and can reach heights of 3 to 10 meters.

The hot water around this chimney is teeming with life.

Lined with black smokers, there's a tube worm that's maybe 3 meters long.

Tubeworms have what looks like red feathers on their heads.

A wide variety of organisms live within colonies of tubeworms: shrimps, fish, lobsters, crabs, clams and arthropods, playing dangerous games between freezing cold and boiling heat.

The existence of this ecosystem was discovered 33 years ago.

Discovery turns the conventional wisdom of science upside down

made scientists rethink the origin of life on earth

Before the discovery of this hydrothermal vent, it was thought that the source of all life on Earth was the sun and photosynthesis.

But here there is no sunlight, no photosynthesis, the chemosynthetic environment is the source of life, and everything is short-lived here.

If you take a picture of this amazing hydrothermal vent, you'll think you're on another planet.

It's amazing that this is on Earth, because it's like an alien planet with aliens.

But eight years later, if you go to the same hydrothermal vent, you might find yourself in a dead world.

no hot sea water

The life is dead. The chimney is standing, but it looks like a ghost town.

However, at about 15 km down

Push! There's another volcano, a hydrothermal vent

A new ecosystem is being created.

The birth and death of these hydrothermal vent organisms repeats across the ridge every 30 to 40 years.

The ephemeral nature of this hydrothermal vent biome is actually not that different from what I've seen in my 35 years of photography trips.

Suppose you took

I go home and I think at home, "Okay, what should I shoot next?

That's right, if you go to that bay, you can shoot

Because there are a lot of soft corals and protopods.”

I go there and they're all dead.

It doesn't look like coral, it's just a blanket of algae that looks like bean soup.

What happened?

I look around and see that the slope of the hill behind has been developed and bulldozers are digging out a lot of dirt.

A golf course is under construction here.

And it's tropical here

it's raining like crazy

Rainwater runs down slopes, washing away construction sites, covering and killing corals.

Golf course manure and pesticides also run into the bay. The pesticides kill off the larvae and small creatures, and the manure causes brightly colored plankton to multiply, and the result is bean soup.

But reassuringly, we've also seen the exact opposite.

I used to go to a bay like garbage

As soon as I saw it, I was overwhelmed and went to the other side of the island to take pictures.

Five years later, when I revisit, that same bay has been restored to great beauty.

Live corals are teeming with fish The water is crystal clear What happened? I would think

What happened was that the local community took action.

They knew and stopped the destruction of nature in the hills. They made laws, they enacted permits, they held home building and golf course maintenance accountable, they stopped sediment and chemicals from flowing into the bay. The bay is back.

The ocean has great restorative powers, we just have to leave it alone.

Margaret Mead aptly says

A small group of thoughtful people will change the world.

exactly what is happening

A thoughtful little group changed the bay.

I'm a big fan of the grassroots movement

I give a lot of talks, and the first question at the end of every talk is, "But what can I do?

i'm only one person

It's overwhelming because the problem is huge and global."

good question

My answer is, don't take it as a huge, overwhelming global problem.

no your backyard

stare at your heart

the problem of where you live

Please fix it

Create a healing spot in your neighborhood and encourage others to do the same

The healing spots may become scattered on the map.

Now that we have the means of communication, we can immediately know what's happening in China in Alaska, in New Zealand like this, in the UK...

People all over the world are talking to each other, and there are no isolated spots on the map anymore, because we're creating a network.

As this healing spot begins to spread, and as it spreads and overlaps, good things will happen.

this is my answer

Look in the backyard, no, in the mirror

Can you be more responsible than what you are doing now?

do it if you can spread it

Hydrothermal vent creatures can do very little about the life and death of the world they live in, but not us here on Earth.

we must think and reason

By changing our behavior, we can have an impact on the environment like the people who restored health to that bay.

In her acceptance speech, TEDPrize winner Sylvia pleads with us to do not just a little bit, but as much as we can to protect our oceans, what she calls a "spot of hope."

i am very much in favor of this

My hope is that among those "spots of hope" we'll also include the deep ocean, a region that historically has been severely neglected, if not abused.

Things that are too big to landfill, too toxic, are being dumped in the ocean.

I hope that the deep sea will also have a "spot of hope."

Now my wish has not come true, but I can say that I will do everything in my power to make Sylvia's wish come true.

and i run

thank you

Screenwriter Adrian Kennedy wrote a book called "The Actors of My Play."

If I were to write a book, the title would probably be "The Artists in My Exhibition." To understand art and culture, which is my work, I need to be with artists and focus on the intentions and personalities of their work.

Jay Jay's "Good Times."

Jean-Michel Basquiat was the first black artist to show me the possibilities of art in real time.

My primary focus is black artists, but through them I explore how art can change the way we think about culture and ourselves.

I'm interested in people who have looked back and created new places for us to see and understand in the world of art, which is timeless to reinvent history and to renew it.

As a curator, what I'm about to tell you is inspired by artists like Glenn Lygon and Carol Walker.

I was originally interested in how we could create new stories in art history and world history.

To do that, I looked at how artists created their work, and I understood their work as a laboratory, and from that perspective, the museum is a repository of knowledge, and the exhibition is a blank answer sheet for asking questions, looking for answers, and thinking about them.

In 1994, at the Whitney Museum of American Art, there was an exhibition called "The Black Man."

It was an expression of racial and gender intersection in contemporary American art.

The purpose of the exhibition was to create a dialogue through artistic expression on a hotly contested subject, and to let those ideas compete in the museum.

In this exhibition, more than 20 artists of all ages and races explored black masculinity from a particular perspective.

What's important about this exhibition is my role as curator and liaison in this dialogue.

What I felt very clearly during the exhibition was that people rely on images to make sense of things.

Leon Golub on the right, Robert Cole Scott on the left

This exhibition, after a heated discussion, completely changed my view of the possibilities of art.

She points to the picture on the left, and I think there's a problem with this picture because it depicts the traditional image of black people.

The right tells me it's a good piece of work that makes me feel proud that it defies the image that's been portrayed in the media.

I confidently answered that the artist's race is that the right one is a black artist and the left one is white, but it's actually the opposite: Bob is black and Leon is white.

In that place and at that time, what I wanted to know was how the images that I wanted to convey were actually conveyed, and how artists create spaces that we cannot imagine from our everyday lives.

Harlem, where I am now, was a spiritual home and a place of the Harlem Renaissance for many black people in America, where they could live a "black" life.

Harlem also looks to the past and to the future, exploring how it should be in this century.

What's interesting about Harlem is that, unlike other cities, we think about the past, the present, and the future all at the same time.

It's all about the past and the future

When I was thinking about that, I came up with a question: How can the museum act as a link to the community?

It's about providing a space for artists who are change agents to reinvent themselves in their communities.

It's Harlem on January 20th. It was such a wonderful day.

Now I'm doing an exhibition at the Studio Museum in Harlem and thinking about what it means to discover the possibilities of art.

What do you think, guys

In an environment similar to yours, in dialogue with other cultures and in creative and innovative thinking.

What if an artist could create? I work with young black artists to help that kind of support.

An artist's job is to be a real liaison, in addition to creating great work.

to talk about my efforts

It is important to touch history, and the Studio Museum's

When it opened in 1968, it was a historic moment. Let's take a look at what has happened since then and consider our privileged position today. And the museum was founded during the height of the civil rights movement, exploring the significance of African-American history and tradition in American art history through the work of Jacob Lawrence and Rohmer Bearden.

Please think about the fact that you have come to this day.

In 1975, Muhammad Ali gave a lecture at Harvard University.

After his lecture, a student asked him to compose a poem,

I replied "Me，We"

Capturing the relationship between individuals and society

These are very meaningful words, and what I'm trying to find out in working with artists is the state of the black art movement in this century.

It's what we mean by cultural movements in our time. Ali's "Me, We" words were a great prophecy for modern society.

Let me tell you about a series of exhibitions I did to achieve my goals, with themes of freeform, frequency, and fluidity. The purpose of the exhibitions was to discover young black artists who are active today and who can be expected in the future.

This exhibition questioned the notion of art as a tether, especially in our time, and explored the implications art has for redefining not only black culture, but culture in general.

I call some artists "post-black" because they're people who build on their past and take a historical step forward.

I came up with something like this

What is the current position of African Americans in the United States?

express in art

Is there a proper museum where we can discuss these things together?

It's really exciting to think about the plethora of power that young artists have.

Artists' work is not only a reflection of their own sentiments and opinions as innovative artistic expression, but more importantly, it is a work of art that stimulates community discussion and allows us to understand where we are and where we are going in the future.

I'm always amazed at how the topic of race pops up in so many unexpected ways.

It's also great that artists are actively working on the subject.

I am interested in art