But when I returned to Warsaw, I found that it was still difficult for women to get university jobs.

the road is not gone

When I returned to Paris, I found Pierre, whom I fell in love with, waiting for me.

A physicist's work piqued the interest of Marie Curie.

In 1896, Henri Becquerel discovered that uranium emits mysterious radiations, like X-rays, that expose photographic plates.

Curie soon discovered that another element, thorium, also emits similar radiation.

Of particular importance was the fact that the intensity of this radiation depends only on the amount of the element and is unaffected by physical or chemical changes.

From this, she concluded that the radiation came from something primal inside the atom.

This idea was revolutionary, overturning the long-held model that atoms are indivisible.

Then they turned to bituminous uranium, a very radioactive ore, and the Curies realized that the radiation could not be explained by uranium alone.

Are there other radioactive elements that are responsible?

In 1898, the couple announced two new elements: polonium, named after Poland, Mali's homeland, and radium, the Latin word for "light."

They also coined the word "radioactivity."

In 1902, the Curies succeeded in extracting 0.1 grams of pure radium chloride from several tons of bituminous uranium ore, a tremendous feat in those days.

That year, Pierre Curie and Henri Becquerel were nominated for the Nobel Prize in Physics, but Mari was not included.

Pierre stood up and tried his best to get recognition for his wife's contributions.

Together, the Curies and Becquerel won the Nobel Prize in Physics in 1903, and Marie Curie became the first female Nobel Prize winner.

With enough money and respect, it was smooth sailing for the Curies.

But tragedy struck in 1906 when Pierre was run over by a carriage at a busy intersection and died.

Devastated, Marie immersed herself in her research and became the first female professor at the Sorbonne, taking over Pierre's teaching position at the Sorbonne.

Her independent research was also fruitful.

In 1911, he won the Nobel Prize again, this time for chemistry, for his discoveries of radium and polonium, and for the extraction and analysis of pure radium and its compounds.

This made her the first, and still the only, person to win two Nobel Prizes in different scientific fields.

Professor Curie applied his discoveries to change the face of medical research and practice.

During World War I, he organized a mobile radiological unit and investigated the effects of radiation on tumors.

But for this service to humanity, she paid a high price personally.

Madame Curie died of bone marrow disease in 1934, thought to be caused by radiation exposure.

Marie Curie's groundbreaking work laid the foundations for our understanding of physics and chemistry, leaving a brilliant trail in oncology, science and technology, medicine, nuclear physics, and many other areas.

For better or worse, her discovery of radiation ushered in a new era and unlocked the great secrets of science.

When the Reverend Jim Jones founded the People's Temple in 1955, few could have predicted its horrific consequences.

This progressive religious movement gained popularity and even gained support from influential politicians in San Francisco.

But in 1977, after allegations of brainwashing and abuse, Jones emigrated to Guyana with hundreds of followers and founded a co-op in Jonestown.

It was billed as a utopia, but in reality it was more like a prisoner of war camp.When Congress sent a delegation to investigate the situation, Jones put his final plan into action.

On November 18, 1978, 909 men and women, including children, died after being poisoned with flavor aid.

The gruesome imagery of this incident is a lingering slang term for "drinking Kool-Aid," which means being obsessed with cult thoughts.

There are thousands of cults in the world today.

There are two important things to remember about cults.

One is that not all cults are religious.

Some are political, some are centered around therapy, some are centered around self-development, and some others.

Conversely, not all new religions are cults.

So how is a modern cult defined? And why do people join cults?

Broadly speaking, a cult is a group or movement, usually committed to some extreme ideology, typically embodied by a single charismatic leader.

There aren't many devastating ones like Jonestown or Heaven's Gate, where 39 people committed mass suicide in 1997, but there are common traits that many cults share.

A typical cult expects strong devotion from its members, and maintains a strict hierarchy that separates unsuspecting followers and newcomers from its inner workings.

Through its doctrines, it claims to answer life's greatest questions, and it has the recipe for the changes needed to turn new recruits into true believers.

Most importantly, it uses formal and informal means of systematically influencing and controlling its members to obey them, and is intolerant of internal disagreements and external criticism.

You might think that such statements apply to some established religions as well.

In fact, the etymology of cult, cultus, was a term for a person who performed rituals, maintained temples, and cultivated devotion to a particular deity.

But that eventually came to mean excessive faith.

Many religions start out as cults, but as they grow up, they become integrated into the larger society.

Modern cults, by contrast, try to separate their members from outsiders.

Instead of giving their members guidance on how to live a better life, cults seek to directly control their members, from personal and family relationships to financial resources and living conditions.

Cults also demand obedience to human leaders who are persuasive, authoritative, narcissistic, and motivated by money, sex, power, or all of the above.

Cult leaders attract early followers with their personal charisma, but as they grow, they become like pyramid schemes, with old members attracting new ones.

Cults are very aware of who they are likely to target, and target newcomers to the community or those who have recently experienced personal or professional loss.

Loneliness and a search for meaning make us vulnerable to friendly partners who provide us with companionship.

The recruitment process can be confusing at first, and it can take months to build a relationship.

In fact, two-thirds of cult members are recruited by friends, family members, or co-workers, making it difficult to turn down offers.

Once you join a cult, you will be educated in various ways.

Some take advantage of people's natural tendency to "mimic social behavior" and "obey orders."

Others are more forceful, using coercive persuasion techniques that appeal to guilt, shame, and fear.

Members often follow willingly out of a desire to belong or to receive promised rewards.

The cult environment discourages critical thinking and makes it difficult for everyone around you to express their full devotion and voice their doubts.

The result is a state of internal conflict called cognitive dissonance, a state of captivity where each compromise makes admitting you've been duped all the more painful.

Many cults, while not killing their members, can be harmful.

By denying freedom of thought, speech, and relationships, cults impede the psychological and emotional development of their members, especially when it comes to children, who are deprived of activities and guidance for normal development.

Yet many cult members eventually find a way out, whether through self-discovery, help from family and friends, external pressure or scandal, and sometimes the cult collapses.

Many cults are difficult to identify, and no matter how bizarre it may seem, beliefs are protected by religious freedom.

The law can still intervene if the activity involves harassment, extortion, illegality or abuse.

Believing in something shouldn't be at the price of family or friends. If someone asks you to sacrifice your relationships and your morals for a greater cause, chances are you're trying to take advantage of others for your own benefit.

Suppose you're asked to come up with something new.

Anything is fine Any material is OK Shape and size are free

With that kind of creative freedom, you can do whatever you want, right?

Not really?

If you're like most people, you're probably stuck on this subject.

I don't even know where to start if I don't have a little more material

Totally unlimited freedom isn't always easy.

In the real world, any project is limited by many factors, such as cost, available materials, and unbreakable laws of physics.

These factors are called creative constraints, which are requirements or limitations that must be met in order to achieve a goal.

Creative constraints are found in many professions: architects, artists, writers, engineers, scientists.

In many fields, constraints play a special role in driving discovery and invention.

Especially in the scientific process, constraints are an essential part of experimental design.

For example, a scientist studying a new virus might ask, "How could we, with the tools and techniques at hand, do an experiment that would reveal how this virus infects somatic cells?

What knowledge gaps are preventing us from understanding new transmission routes? ”

In engineering, constraints drive the application of scientific discoveries to the invention of something new and useful.

For example, the Mars probes Viking 1 and 2 used controlled rockets to land safely on the surface of Mars.

what's the problem?

Control rockets left extraneous chemicals on the ground, contaminating soil samples.

So a new constraint was introduced

How can we land a rover without bringing chemicals from Earth to Mars?

The next rover, the Pathfinder, used an airbag system that allowed the rover to bounce and roll to the ground without burning polluting fuel.

A few years later, we wanted to send a much bigger rover, Curiosity, to Mars.

It was too big to use the airbag method, so another constraint was put in place.

Can we land a large rover while keeping rocket fuel away from Martian soil?

An engineer came up with a crazy idea for this.

"Sky Crane" method

Hang the rover from a high place like a crane game at an arcade.

With each invention, the engineers demonstrate a scientific thinking mindset: that in order to advance technology, we need to recognize the limitations of current technology.

Progress can be iterative: "How can we build a better parachute to land the rover?"

And sometimes progress can be revolutionary, like, "When the best parachute isn't working, how do you get there?"

In both cases, the constraints guide the decision to achieve the goal.

And here's another unsolved Mars challenge.

We want to send astronauts, but for that we need water.

We need filtration systems that keep water clean and 100 percent reusable.

This is a very difficult constraint, and the technology may not yet exist for it.

But in the process of trying to achieve that goal, the inventions that emerge may find other uses.

In our quest to create breakthrough water filtration systems, we may have answers that can help farmers in drought-stricken areas, or water purification technologies that can be used in heavily polluted cities.

In fact, there are many cases in scientific progress where unexpected failures in one area have been made by meeting constraints in other areas.

Scientist Alexander Fleming accidentally soiled a Petri dish in his laboratory, leading to the discovery of the first antibiotic, penicillin.

The same goes for the invention of synthetic dyes and plastics and gunpowder.

Both were misinvented, but they solved the constraints of another problem.

Understanding constraints drives scientific progress, and what's true in science is true in many other fields.

Constraints don't limit creativity, they're the foundation of it.

As researchers, we often use vast resources to achieve something or achieve an end.

This is necessary for scientific progress, but it also creates an unfortunate situation.

Because only a very small percentage of people actually participate in those quests and benefit from the technology, and that's what motivates them.

What makes research exciting is when we find simple ways to dramatically change those biases and make these technologies more accessible to a much wider audience.

An example of this is the remote control for the Nintendo Wii, which has recently received a lot of attention on the Internet.

For those unfamiliar with the game, this is a console controller that you can get for 40 bucks that has motion sensors built into it that you can use to play the game like a tennis racket or a tennis racket.

Although it is advertised that it can be used like a baseball bat

I'm much more interested in the pretty smart infrared camera on the top of this controller.

Here's a computer connected to a projector

You put the Wii remote on top of it, say you're in school and you don't have a lot of money.

I think a lot of schools do, or maybe a company wants to use an interactive whiteboard, and it usually costs two to three thousand dollars to buy.

I want to show you that you can make it using the Wii Remote.

And for that, you'll need one more piece of hardware: this infrared pen, if you go to a discount electronics store.

It's easy to build for about five bucks and all you need is a battery, a button and an infrared LED.

You can't see it, but when you press a button, it lights up, and when you run this software,

A camera captures a spot of infrared light After registering the pixel position of the camera and the pixel position of the projector, it will function as an electronic whiteboard.

(applause)

For about 50 dollars, you can build your own whiteboard, and I'm using Adobe Photoshop right now.

(Applause) ("Hell!

handwriting) Thank you (laughs)

This software is available on my website for free download, and it's been three months since I published this project.

Downloaded over 500,000 times by teachers and students around the world

(Applause)

There are limits to what you can do with 50 dollars this way, but you can do 80% of what you want at 1% of the cost.

We can do it, and the other good thing is that the camera can capture multiple points.

So it's not just interactive whiteboards, it's multitouch. (Applause)

The second demo attaches this Wii remote to the TV.

Instead of facing the screen, try to point it away from the screen

And what's interesting about this is that when you wear protective eyewear with two infrared light sources like this, the computer can figure out roughly where your head is.

Then you run a program on your computer that shows you a 3D room with floating targets like this, which is common in video games.

It looks like a 3D room, but the image is almost flat and sticks to the surface, but when you turn on head tracking,

The computer will be able to change the image displayed according to the movement of the head.

(smile)

(Applause) This might come as a bit of a shock to the game developer community. (Laughter)

After all, if you have a Nintendo Wii, you can do this for an extra $10 worth of hardware.

Actually, Lewis Castle is over there, but last week they announced that electronic arts, the biggest video game software company, will be launching a game in May that will have a hidden feature that uses head tracking.

In just five months, you'll have a major commercial product.

(Applause) Hi

But what was more interesting to me than those two products was how people discovered it.

It's fundamentally changed the way and the speed with which we go out into the world, and I'm working with video cameras in my lab.

In the first week alone, a million people watched this work, and in just a few days, engineers, teachers, and students all over the world were using my system, or their modifications, and posting videos on YouTube.

I hope that online videos will become widely used in the research community.

Thank you very much (standing ovation)

Look at the human brain, as far as the eye can see, it's clearly divided into left and right bumps.

It's this structure that gave rise to the best-known idea of ​​the brain: that the left hemisphere governs logic, and the right hemisphere governs creativity.

But this is a myth with no scientific basis.

So how did this misleading idea come about and where did it go wrong?

It's true that there is a right side and a left side of the brain.

This is best seen by looking at the superficial layer called the cortex.

The internal regions, such as the striatum, hypothalamus, thalamus, and brainstem, also appear to be made up of continuous tissue, but they actually each have a left side and a right side.

In fact, the left and right sides of the brain are responsible for different functions in the body, let's take movement and vision.

The right side of the brain controls the movement of the left arm and left leg, and vice versa.

the visual system is more complex

Both eyes each have a left and right field of vision.

The visual field of the left eye is sent to the right side of the brain, and the visual field of the right eye is sent to the left side.

So the brain uses both sides to get a complete picture.

There is no scientifically clear answer as to why left-right crossover occurs.

One theory is that it all started when animals began to have more complex nervous systems, and quicker reflexes gave them a survival advantage.

When an animal sees a predator approaching from the left, it's best for the animal to flee to the right.

So it's safe to say that visual field and motor control are systems that depend on the structure of the left and right sides of the brain.

This misunderstanding began in the mid-1800s, when two neurologists, Broca and Wernicke, examined patients whose communication was impaired by trauma.

They found damage to the patient's left temporal lobe, suggesting that language is dominated by the left side of the brain.

This captured the public imagination

Writer Robert Louis Stevenson took the idea of ​​the logical left hemisphere and the emotional right hemisphere competing with each other, and brought it to life with characters in "Dr. Jekyll and Mr. Hyde."

But this idea could not be proven when doctors and scientists looked at patients who were born with one side of the brain missing or split left and right.

Patients' movements spanned the full spectrum, both logical and creative.

Later studies showed that in some functions, one side of the brain was more functional than the other side.

Language is more dependent on the left hemisphere, attention is more dependent on the right hemisphere.

It's possible that one side of the brain works more, but that's systemic, not individual.

There's no evidence to suggest that some people have a unilateral brain, and no evidence to support the idea that the left and right hemispheres are separate for logic and creativity.

Some people are particularly logical and creative, but it doesn't matter which side of the brain they have.

In the first place, the idea that logic and creativity are at odds with each other goes against the truth.

Solving complex math problems requires a great deal of creativity, and many vibrant works of art have intricate logical frameworks.

Almost everything that creativity and logic accomplishes shows that the whole brain is working as one.

An estimated 2.5 to 4 million sports-recreation-related concussions occur annually in the United States.

How dangerous are concussions?

The answer is complicated, it depends on how your brain reacts to the impact.

The brain is made of jelly-soft, fatty tissue, and this delicate organ consists of a hard skull and

Well protected by internal protective membrane

And that sudden impact can dislodge the brain and hit the inside of the skull.

It's made up of a network of 90 billion neurons that carry signals down long axons to the brain and control the body.

Nerve cells are spindle-shaped, so they are susceptible to external forces and can be stretched or even ruptured when impacted.

As a result, not only is signal transmission blocked, but the damaged axon degenerates, releasing toxic substances that can destroy other neurons.

These complex processes lead to a concussion.

Symptoms can range from loss of consciousness, headaches, blurred vision, disturbances in balance, changes in mood and behavior, disturbances in memory, thinking, and sleep, and psychiatric disorders such as anxiety and depression.

Everyone's brain is different, so the symptoms of a concussion are different.

The good news is that in most cases, the symptoms disappear and completely heal within a few days to a few weeks.

Get plenty of rest and refrain from activity for a while to allow your brain to heal on its own.

Speaking of rest, have you ever heard that if you fall asleep right after a concussion, you risk going into a coma?

this is just superstition

No problems have been reported from falling asleep, except in cases of suspected severe brain trauma such as intracerebral hemorrhage.

Occasionally, some patients develop post-concussion sequelae (PCS).

Symptoms may indicate persistent headaches, learning disabilities, and behavioral changes, including relationships, that last for months or years.

Forcing yourself to play for even a few minutes immediately after a concussion, or rushing back into the sport, increases the risk of PCS.

Diagnosing a concussion can be difficult because symptoms develop gradually.

Of particular concern are minor impacts to the head that do not cause concussion.

Symptoms may not appear immediately, but if repeated, they can eventually lead to serious degenerative brain disorders.

For example, the header that accompanies soccer

A technique called diffusion tensor imaging is beginning to reveal its effects on the brain.

We use this method to find thick axonal bundles and look for structural changes due to mild impact.

A 2013 report using this technology found that the player who took the most headers in a year (about 1,800) had

We found structural damage to the axonal bundles, just as the rope itself breaks apart as individual fibers deteriorate.

These athletes also performed poorly on short-term memory tests, and even though they had no overt concussions, the accumulation of minor impacts led to the damage seen on the tests.

Studies have linked excessive numbers of mild shocks to concussions to a progressive form of brain degeneration called chronic traumatic encephalopathy (CTE).

People with CTE develop disturbances in thinking and memory following mood and behavioral changes in their 30s and 40s.

It can also lead to dementia, and the culprit is a protein called tau.

It normally protects the microtubules within the axons.

When microtubules are damaged by repeated impacts on the brain, tau is released and aggregates.

It interferes with neuronal signaling and impairs signaling in the brain.

Once tau starts to aggregate, it accelerates aggregation and spreads throughout the brain even after the impact on the brain has stopped.

Between 50% and 80% of concussions among football players go unreported and untreated.

Whether a concussion occurred in the first place

Sometimes it's hard to make decisions, sometimes you're aware of something wrong, but you give in to the pressure to continue playing or not.

Not only does this impede recovery

it's very dangerous

the brain is not immortal

First of all, it is important to prevent impacts and to properly treat impacts that have been received.

fish are in danger

In the 1990s, cod populations plummeted off the east coast of Canada, extreme recreational and commercial fishing led to a dramatic decline in goliath groupers in southern Florida, most tuna populations plummeted by more than 50 percent, and Atlantic bluefin tuna are endangered.

I just gave you one example

Overfishing is happening all over the world

Why?

When people think of fishing, they imagine lounging on a boat and patiently reeling in the day's catch.

The modern seafood industry is at war to fill grocery store shelves.

In fact, we're using technology that was developed for warfare.

Radar, sonar, helicopters, reconnaissance planes, all of which are used to direct fish processing vessels to dwindling shoals of fish.

Hundreds of hooks attached to long ropes and huge nets attract large numbers of fish, along with other species such as seabirds, turtles and dolphins.

The fish are hauled into huge ships equipped with flash freezing and processing equipment.

All of these different technologies have made it possible to land fish in deeper, farther waters than ever before.

As the fishing area has expanded, so has the variety of fish to target.

For example, the toothfish doesn't sound or look very appetizing.

Until the late 1970s, fishermen didn't pay attention.

Then they marketed it to chefs in the United States under the new name Chilean sea bass, which is actually a kind of cod.

It quickly appeared on markets around the world and is now considered a delicious fish.

Unfortunately, these deep-sea fish don't breed until they're at least 10 years old, and when young fish are caught, they don't get a chance to spawn, making them extremely vulnerable to overfishing.

Consumer tastes and prices can also have a negative impact.

Shark fin soup, for example, was very popular in China and Vietnam, and the fin became the most lucrative part of the shark.

That's why many fishermen have started dumping large numbers of shark carcasses at sea, leaving only the fins on board.

This is not a problem unique to greenlings and sharks.

Nearly 31% of the world's fish species are overfished and 58% are fished at sustainable levels

The rate at which wild fish reproduce can never keep up with the consumption of 7 billion people.

Fisheries also affect the wider ecosystem.

Wild shrimp are typically caught by dragging a net the size of a football field along the seafloor, disturbing or destroying the seafloor's biodiversity.

Shrimp usually make up only 5% of the harvest.

Other unwanted bycatch organisms are returned dead to the sea.

It's not that coastal shrimp farming is better.

Mangrove forests are cleared to make shrimp ponds, depriving them of coastal plant communities that act as windbreaks and water filters, leaving no fish habitat for fry to grow.

So how do you get your fish to rest and recover?

There are many ways to protect

Governments can restrict how, when, where and how much they can fish in their territorial waters, and they can regulate certain types of vessels and certain types of equipment.

Harmful practices such as bottom trawling can be outlawed entirely, and no fishing allowed — marine protected areas can be set up to help restore ecosystems.

Consumers also have a role to play in putting pressure on the seafood industry, through awareness and boycott campaigns, to end wasteful fishing practices like shark fin fishing and replace them with more sustainable practices.

interventions in the past have helped restore depleted resources,

there are many solutions

The best practices for local fisheries should be science-based and respectful of the communities that depend on the ocean and the fish that live in the wild.

This rule must be enforceable

International cooperation is sometimes necessary, because fish knows no borders.

we need to end overfishing

Ecosystems, food security, jobs, economies and coastal cultures all depend on the outcome.

At that time, I was in a church in Texas, full of souls and bodies, waiting fearfully for the last moments of my life.

In exactly such a hall, I sat low in a crumbling wooden chair covered in red rags, with an organ to my left, a choir behind me, and a baptism vat in the back.

there is no change

A rush of tension, an earnest wish for salvation, sweaty palms, and the uninterested people sitting in the back.

(Laughter) December 31, 1999, the night of Christ's Second Coming, when I believed the world would end.

That year, I had just turned 12, the age at which the scriptures officially allow me to be a full-fledged adult.

I was tempted to complain that it wasn't fair that the world was ending, but it was the end of the year, and I had to rethink my future.

Change your mind and go to church as often as you can

I prayed so earnestly that I forgot the passing of time.

And just to make sure, I was reading all the popular books at the time that said, "Please save me."

I once found in a letter that in that fateful hour, if one person lacks faith, more tragedy awaits.

Anyway, my task is to control all desires, to overcome demons and inertia, to triumph over my own unbelief.

It's hard for a 12-year-old. (Laughter) Trust me you can do it.

(Laughter) The time is finally near.

23:50

With the remaining ten minutes, the pastor gathered us in front of the altar to greet with deep prayer the moment when the hands of the clock pointed to the hour of destiny.

people of all denominations come together

The choir remains, and the deacons and their wives -- the bourgeois parishioners, if you will -- (Laughter) take the front row of the altar.

As you know, in America, even the Second Coming of Christ has VIP seats.

(Laughter) (Applause) Right behind those VIPs are the elderly. I think of their young backs, working in the cotton fields in the blazing East Texas sun.

They are the main characters for me.

They devoted their whole lives to this moment, just as their medieval predecessors waited impatiently for the coming of the latter days, like my grandmother, who thrived on a talk show that started at four o'clock every day.

She also went to the altar, and I snuck her behind, and I was sure she was going to heaven.

I was thinking that if I could hold her hand during prayer, maybe we could go to heaven together.

I held my hand and closed my eyes. I listened and prayed.

The pastor's voice is rough

The prayer that responds becomes a cry that echoes in the church

The melody on the keyboard gains momentum

The heat that accompanies it envelops the church

I'll hold my grandmother's hand again so she won't be left behind

Faced with the horrors of fate, I fled into the darkness behind my eyelids

And that voice pours down, "Amen"

it's over

the hands of the clock

The fateful hour has already passed

A savior didn't appear And I stared at them with watering eyes, trying to hide their disappointment.

Seeing them like that made my heart hurt

They were deceived, deceived victims, and I was one of them.

I've been praying

I am the one who experienced the baptism of that ordeal not once, but twice.

I believed

until then surely

I got home and turned on the TV to see Peter Jennings celebrating the beginning of a new millennium, and the news was playing around the world.

At that moment, a strange thought crossed my mind.Does God care about the time difference and descend again and again?

(Laughter) This epiphany was so silly and cruel.

But still I didn't stop believing

And then you have a new faith, the faith that there is no one answer.

My answer was wrong The problem itself was wrong It's a belief that confronts the absurdity

New sunlight shines into the frozen, motionless winter mountain called "faith" The thawed water of possibility has begun to flow into an unseen landscape.

I still think back to that night when my savior didn't come.

Even among the many people who celebrated the year 2000 in a completely different way, I'm sure there are others who say that they're here after a path similar to what I've been through since the dawn of the new millennium, from the day my mother left, my father out of touch, and even God rejected me.

I reached out to grab something to believe in this time

When I was 18, I entered Yale University, and I thought at the time that it would be the perfect opportunity to let go of all the dark pasts I saw in Oak Cliff, Texas, where people were shattered and had no hopes or dreams.

But one day, during winter vacation, I was lying face down on the floor of my house with my hands tied behind my back and a robber holding a gun to my head, and I finally realized that education wouldn't save me either.

In 2008, I reached out for my next salvation, a company called Lehman Brothers.

(Laughter) I can't wait to see what happens. (Laughter) I'm going to call home in a hurry to make sure I don't have to worry about money anymore.

(Laughter) But even that financial hub crumbled before my eyes, and even business abandoned me.

As a youth staff member in Washington, D.C., I reach out for my next hope.The voices I hear from Illinois shout loudly, "The time has come." "Change is coming to America."

But Congress faltered, the state rather ripped hopes apart, and "Change" became an unfunny joke.

At that altar called the American Dream, I pledged my allegiance and knelt down to the god of capitalism for success, wealth and power.

Yet when the date changes I open my eyes to wonder if there really was no God

That night and I decided to face it again.It wasn't about being brave.I had no choice but to die or believe.

And then I made my way to the next sacred place, Harvard Business School.

Effort still not enough

It was one night, not long after the harsh Cambridge winter had begun, and in the quiet corner of the party, three friends and a topic arose.

(Laughter) We had no idea where we were going or how we were going.

But I was obsessed with Jack Kerouac's novels, "Sneak into the night and disappear." We set off to find out what the hell was going on in this country.

Of course, there were many voices who opposed it, and above all, they were extremely honest, but anyway, I took a step forward.

In the summer of 2013, an 8,000-mile trip around the United States began. Through the meadows of Montana, the ruins of Detroit and the swamps of New Orleans.

For me, who was trained at the highest level of capitalism, it was rather revolutionary.

(Laughter) This idea grew into a non-profit organization called MBAs Across America, and it was that wave that got me on the stage at TED.

We've noticed how greedy our generation is for purpose and meaning, foreshadowing that wave.

We finally realized that the millions of entrepreneurs behind the scenes who are creating jobs and driving change needed a little more help.

And to be honest, the other important thing is that I tried to make waves.

Once upon a time, I certainly had the idea that as many people as possible could think that each social enterprise could heal the wounds of this collapsing country and put it back on its feet.

But this missionary journey has brought me to a new gospel, and that's why I'm here today.

About a year ago, one evening, I was at the Museum of Natural History in New York at a gathering of Harvard Business School alumni.

Beneath a life-size replica of a whale hanging from the ceiling, we shared seats with the fuunzi of the era, praising each other's achievements and the spirit of contributing to society.

It was a space filled with pride, the connections that gathered there, and the wealth that they had, well over $500 billion.

When you look at what we've accomplished, it's all beautiful

(Laughter) But that's not the end of the story. Two days later, I was on business in the Harlem area. I was sitting on a farm built on what was once a vacant lot, and I was listening to a man named Tony tell stories about the children who came to the farm every day.

It's about these kids who live below the poverty line.

Even when they're sleeping, they're holding their bags so they don't get stolen at homeless shelters.

Tony's program, called "Harlem Grown," these children come for one meal a day.

After 20 years as a taxi driver, Tony cut through his pension to start the program.

He didn't get paid, because while his activities expanded, he was short on funds.

He said he would hold on to any straw

and i decide to be that straw

On the way home, a dull sound resounded in the depths of my chest, and tears simply flowed.

I was so ignorant that under one roof, a replica whale floated and people moved $500 billion, and two days later, just 50 blocks north, under an open sky, a man was working for nothing to feed his children.

I didn't cry over inequality, not out of pity for hunger or homeless children, not out of anger at the riches of the 1%, or out of sympathy for the poverty of the 99%.

I was just shaken by the fact that I was on a dialysis machine in a country with kidney disease.

I realized that my story was for those people who, even if they didn't have shoes, had to keep going. I had my organization, my voice, to reach the neglected stricken areas of Harlem, Appalachia and New Orleans.

That epiphany made me feel utterly ashamed and reminded me of the absurdity that Peter Jennings' new millennium was repeating over and over again.

deceived deceived deceived

But this time I was the false savior myself.

That night when I believed the world was ending I've taken a long way from that altar From that world where I believed that suffering was the redemption to God That God's word was everything And that the scriptures were the truth

After a long road, I'm standing at the starting point again

The times we live in are not times of disbelief, or rather, we believe as much as we have in the past.

Brené Brown, some will take her at her word, maybe Tony Robbins.

"The New Yorker." "Harvard Business Review." Some people believe them.

Above all, right now in the church called TED, we're praying. We want to believe. We need to believe.

We ourselves want leaders who can solve all kinds of problems.

They believe that suffering is a necessary evil in the god of capitalism. They believe that the verse of technological progress is absolute.

But when we are so afraid of our beliefs being shaken from their foundations that we fail to question each element of our foundations, the human cost of it is overlooked.

If something you have to accept is holding you back, it's time to stop and ask.

The gospel of creativity, innovation and social, environmental and economic responsibility is not my domain.

I'm not actually trying to spread any dogmatic gospel here.

The existence of the gospel of doubt, that's why I'm here

This gospel doesn't tell you to stop believing, it just calls for a new attitude, the idea that there is more than one answer.

Accepting the mistakes of the past and leaving room to acknowledge the absurdity of the question itself, which is also a mistake.

This gospel of doubt suggests that we may be all wrong in this place, in this space.

"Why?" That question is the gospel

Where is the need for people to suffer in vain, abandoning the power given to us to question again?

It's this belief in questioning that led me to make a decision about what I do, MBAs Across America, and I made it a non-profit.

We cut our staff, stopped hiring new people, and made our business model publicly available and shared freely by anyone who needed it.

The question of why asked me to abandon the role of savior that people had placed upon me, because our lives are too short to wait one more time for Christ's second coming in the face of the truth that miracles do not happen.

This gospel of doubt will give you courage and hope, even when you feel hopeless and hopeless, and illuminate your future.Even in times of pain and suffering, you will not drown in the thoughtlessness of blind faith.

thank you

(applause)

[The power to try all impeachments rests exclusively with the Senate — the Constitution of the United States.] It is understood that most jobs are fired at some point, such as when you commit a crime, when you are unfit, or when you simply do poorly.

But what if that job was the most powerful position in a country or in the world?

That's where impeachment comes in.

Impeachment itself does not remove a person from office.

Like the indictment in a criminal trial, it's a public appeal to bring a case to trial, with a final outcome in the form of guilt or innocence.

Originating in England, the impeachment system allowed people to be removed from government without the king's consent by a vote in parliament.

This provided an important brake on the king's power, but he himself could not be impeached, as he was considered the source of government power.

But the founders of the republic in America had no higher authority than the people.

So in impeachment adopted in the United States, congressional power extends to any office, and the president is no exception.

Any member of the public can file a petition for impeachment, but only the House of Representatives can actually initiate the impeachment process.

First, the matter goes to a committee, usually the House Standings Committee and the Judiciary Committee.

The commission reviews the allegations, examines the evidence, and makes recommendations.

If there is sufficient grounds to move forward, the House will vote separately on each item of the complaint, known as the articles of impeachment.

If even one case gets a majority, that person is impeached and put on trial.

The trial following impeachment will be held in the Senate.

Members of the House of Representatives, called managers, are the prosecutors, and the impeached and their lawyers are the defendants.

The Senate acts as a judge and jury, administering trials and hearing all arguments before deliberating.

If the president or vice president is impeached, the Chief Justice of the Supreme Court presides.

Conviction requires a supermajority of two-thirds or more, in which case you are automatically disempowered.

Depending on the charges, you may be restricted from holding future government positions or face normal criminal prosecution.

What is it like to be impeached?

It gets a little complicated

Unlike in Britain, impeachment in the United States is a battle between an elected representative and an elected member of another government.

So, to prevent impeachment from being used as a political tool, the Constitution limits impeachment to treason, bribery, and other serious crimes and misdemeanors.

Yet there is still a lot of room for interpretation, and because of the politics involved, many impeachment trials are bipartisan.

But it's generally understood that the impeachment process addresses serious abuses of power.

The first person to be impeached was Tennessee Senator William Blount in 1797 for conspiring with Britain to take Louisiana, a Spanish colony.

Since then, the House has held about 60 impeachment inquiries, but only 19 of those have advanced to actual impeachment proceedings.

Eight cases that were convicted and dismissed were all federal judges.

It's even rarer for a sitting president to be impeached.

President Andrew Johnson was impeached in 1868 for attempting to remove Secretary of War Edwin Stanton from office without the Senate.

More than a century later, Bill Clinton was impeached for making false affidavits in a sexual harassment trial.

Both were eventually acquitted because they didn't get the two-thirds vote required for conviction in the Senate.

Contrary to popular belief, Richard Nixon wasn't actually impeached over Watergate.

I resigned before that because I knew that if I was impeached, I would be guilty.

In theory, the U.S. government is designed in advance to prevent abuse of power. Each branch has checks and balances, tenure, and freely elected limits.

Impeachment could be seen as an emergency brake if those safeguards didn't work.

For those of you wondering, this is not a dress, and I'm not going to tell you what you're wearing underneath.

(Laughter) It's called "Go."

national costume

In Bhutan all men dress like this

women dress like this

Like women, men wear bright colors, but unlike women, they show off their legs.

(Laughter) The national costume is unique, but that's not the only thing that makes Bhutan unique.

And it's true that we're keeping our carbon neutral pledge.

Before I continue, let me give you some background.

about bhutan

Bhutan is a small country nestled in the Himalayas.

It has been hailed as Shangri-La, and is even said to be the last unexplored region.

But let me tell you, our country is not Shangri-La.

It's not even a big temple country where monks live happily ever after.

(Laughter) The reality is that with just 700,000 people, it's surrounded by two of the most populous countries in the world: China and India.

So our country is struggling to survive in a small developing country.

I'm still doing my best, I'm surviving

In fact, our country is prosperous, and the reason for our prosperity is, fortunately, thanks to our outstanding kings.

A conscientious royal family has been tirelessly committed to the country's growth, carefully balancing economic growth with social development, environmental sustainability and cultural protection within a framework of good governance.

This holistic approach to development is Gross National Happiness, or GNH.

In the 1970s, as you know, the 4th King proposed that Gross National Happiness is more important than Gross National Product for Bhutan.

(Applause) Since then, all development in Bhutan has been built around GNH, a pioneering vision aimed at maximizing the well-being of its people.

But that's easier said than done, especially in the world's smallest economy.

Our GDP is less than $2 billion.

There are people in this room who are making more money -- (Laughter) -- and I'm sure they have more personal economic power than our country.

Even with such a small economy, there are some things that are worth noting.

All education is free

Free school education is guaranteed for all citizens, and students who make an effort can go on to college for free.

Medical care is completely free.

The examination, treatment, and medicine are all paid for by the government, so they are free of charge.

We are able to do this because we are very careful with our limited resources, and we continue to uphold the core mission of the GNH: development with value.

Bhutan's economy is weak and must be strengthened.

Economic growth is important, but we must do so without compromising our unique cultures and pristine nature.

Bhutanese culture flourishes today

Unique art, architecture Food, festivals Monks and temples are our pride

Of course, it's also traditional clothes.

That's why I wear "Go" with pride.

Let me tell you something interesting. It has the biggest pocket in the world.

(Laughter) It starts here, goes around the back, and connects here.

You can put everything in this pocket: your phone, your wallet, your iPad, your office papers, your books.

(Laughter) (Applause) But sometimes, I put more valuable stuff in there.

This is how our culture flourishes, and so does our environment.

72% of the country is covered with forests

The constitution stipulates that more than 60% of the country's land must always be maintained as forest.

(Applause) Our constitution -- this constitution imposes on our people the protection of our forests.

The king also mandated democracy in this constitution.

Our people didn't want democracy in the first place.

I didn't ask for it, I didn't fight for democracy

Instead, the king imposed democracy on his people, advocating for democracy in the constitution.

This is not the only

The king also made provisions in the constitution that included the right of the people to denounce the royal family, and also required all monarchs to retire at the age of 65.

(Applause) In fact, there's a king who's already retired. His Majesty the Former Fourth King, who retired 10 years ago, at the height of his popularity.

I was only 51 years old at the time.

Now, as I've told you, Bhutan is 72 percent covered in forests, and all of it remains undeveloped.

This is why Bhutan has one of the most diverse concentrations of ecosystems in the world, and why it is carbon neutral.

Bhutan is a carbon neutral country as the world is threatened by climate change.

this is really important

Of the 200-odd countries in the world, we are the only country that is carbon neutral.

However, strictly speaking, it is not

not carbon neutral

It's carbon negative.

Bhutan as a whole emits 2.2 billion tons of carbon dioxide, but the country's forests remove more than three times that amount, which means our country is capable of absorbing more than 4 million tons of carbon dioxide per year.

This is not the only

(Applause) We export most of the renewable electricity generated from domestic torrents.

So the clean energy we export today offsets about 6 million tons of carbon dioxide from our neighbors.

By 2020, we plan to export enough electricity to offset 17 million tons of carbon dioxide.

And if we tap into even half of our potential hydropower capacity -- which we're working on right now -- we could offset 50 million tons of carbon dioxide a year in the clean, green energy we export.

That's more than the entire city of New York emits in a year.

In other words, Bhutan is a domestic sink of carbon dioxide.

Externally, it's a country that offsets carbon dioxide.

this is very important

Global warming is on the rise, and climate change is a real threat.

Bhutan is also affected

Our country's glaciers are melting, causing floods and landslides, causing disasters and widespread destruction.

Recently visited this lake

it's a wonderful sight

10 years ago it looked like this 20 years ago it looked like this

Only 20 years ago this lake didn't exist.

It was a hard glacier

A few years ago, a similar lake burst and flooded, wreaking havoc on the bottom.

This is what happened with the outburst of a single glacial lake.

There are 2,700 such glacier lakes in Bhutan.

The important thing here is that our country and its people are not contributing to global warming, but we are already suffering from it.

It's a very difficult situation for a small, poor, landlocked, mountainous country.

Still, I can't just sit back and watch

stand up to climate change

That's why we've kept our carbon neutral pledge.

This oath was taken in 2009 during COP15 in Copenhagen, but no one noticed.

Governments were busy arguing and blaming climate change, so when a small country raised its hand and declared, "We pledge to always be carbon neutral," nobody heard.

no one cared

At COP21 in Paris last December, Bhutan once again pledged to always be carbon neutral.

at this time

everyone listened

What was different in Paris was that the governments came together and were willing to come to grips with the reality of climate change, join hands, and work together as one.

All countries, from micro-states to superpowers, have pledged to reduce their greenhouse gas emissions.

The United Nations Framework Convention on Climate Change has announced that if this "promise" is met, it will bring us closer to the goal of limiting global temperature rise to 2 degrees Celsius.

By the way, I'm asking the TED organizers to raise the temperature in the room by two degrees, so if you're feeling hotter than usual, you know who to complain to.

It's very important that we all keep our promises.

As for Bhutan, we will continue to live up to our carbon neutral pledge.

Here are some ways

We provide free electricity to rural farmers.

The aim is that electricity is free, so you can cook without using firewood.

We also invest in sustainable transportation and subsidize the purchase of electric vehicles.

We also subsidize the cost of purchasing LED lighting, aiming to go paperless within the government.

Through the national program "Clean Bhutan," we're doing cleanups across the country, and we're planting trees all over the country, and this is another national program called "Green Bhutan."

But protected areas are at the core of any carbon neutral strategy.

as our carbon sink

It's like the lungs that breathe.

Today, more than half of the country's total land area is protected areas of national parks, nature reserves and wildlife sanctuaries.

The beauty of this region is that it's all connected through biological corridors, migration routes for plants and animals.

This means that wild animals can move freely within the country.

For example this tiger

Found at 250 meters above sea level, in a hot subtropical jungle.

Two years later, the same tiger was spotted at about 4,000 meters above sea level, this time in the cooler alpine mountains.

Isn't it great?

(Applause) We have to keep this.

We must keep this wonderful state

Every year, Bhutan sets aside funds to protect protected areas across the country from poaching, hunting, mining and pollution, and to help the people who live within these areas to manage their forests, adapt to climate change, and improve their living standards while maintaining the harmony of Mother Nature.

it just costs

In the next few years, our small economy won't be able to cover all the costs of protecting our country's environment.

In fact, I did some math and found that it would take at least 15 years before we could fully afford this expense.

But for Bhutan and the rest of the world, 15 years would be too late.

So His Majesty the King started “Bhutan For Life”

buy us time

gave me room to breathe

This is a financing mechanism to manage and protect the country's natural areas until Bhutan has sufficient economic strength.

The aim is to solicit transition funds from individuals, companies and institutions, but only when pre-determined conditions are met and the funds are in place, the transaction goes through.

Multi-stakeholder, performance-at-achievement inspired by Wall Street.

Each investor backs an underfunded project and eliminates the fear of being left behind.

It's like a Kickstarter project, except that it has a 15-year deadline and millions of tons of carbon dioxide at stake.

Once the deal is done, the transition fund will protect the natural areas, and at the same time, it will give our government time to gradually increase the funding until the end of the 15-year period.

After that, the government of Bhutan will raise the money on its own.

the goal is near

Expected to be completed by the end of this year

so i'm very excited

(Applause) I want to say a big thank you to the World Wide Fund for Nature, who are our key partners in this project, in Bhutan and around the world, doing great work.

(Applause) Well, it's getting hot.

Thank you for listening to our carbon neutral pledge and how we are protecting our pristine environment, for us, for our children, for your children, for the world.

But we don't just listen

We're here to dream together

So I'm going to tell you about one last dream.

With our leadership, our resources, our influence and our passion, we can replicate the idea of ​​"Bhutan For Life" in other countries so that protected areas can continue to be protected there.

because many countries are facing the same problem as Bhutan

We have natural resources that can also win the battle for sustainability, but we can't afford to invest in them right now.

So it's a global fund that does "Earth For Life" and "Bhutan For Life" all over the world.

I ask for your cooperation. Let's deliver this dream to all people who care about the future of the earth across borders.

Let's talk about our dreams together Let's join hands Let's fight climate change together Protect the planet

because this is a problem for all mankind

Even if the clothes are different, the problem is the same

thank you very much kadrin chhe la thank you

(Applause) Thank you very much.

What I am about to say is my personal opinion and does not reflect the views or policies of any particular prosecutor's office.

(Laughter) I'm a prosecutor.

believe in law and order

I was raised by adoptive parents who were Marine Corps officers and hairdressers.

I believe that people are responsible for their actions and that everyone should be able to live safely in society.

i love my job i love my friends

We believe it is our responsibility to improve our work.

Now, raise your hand and answer: By the time you're 25, did any of you here misbehave in school, go to places you were told not to go to, or drink before the legal drinking age?

(laughter) yes ok

Who has shoplifted, tried illegal drugs, or been in a violent situation, including brothers and sisters?

So how many of you have been incarcerated for a day as a result of such behavior?

How many of you here think or deserve to be considered a danger to society because of this youthful ingenuity?

(Laughter) No, you don't.

When we talk about reforming the criminal justice system, we are limited in what we look at, and that's what I want to talk to you about today.

But first -- you've all been honest with me, so I'll confess.

I went to law school, but it was for the money.

I had no intention of becoming a civil servant, I had no interest in criminal law, and I never thought I would become a public prosecutor.

At the end of my freshman year, I worked as an intern at the Roxbury branch of the Boston District Court.

I knew Roxbury was one of the poorest neighborhoods in Boston, with high levels of gun violence and drug crime.

My legal career and my life changed on this first day of internship.

When I entered the courtroom, I saw people filling the seats, and one by one, they stepped forward and said one word: "I plead not guilty."

overwhelmingly black and brown

In response, judges, lawyers, and prosecutors make life-changing decisions without listening to you.

was overwhelmingly white

As I watched each person come forward in court, I kept thinking, "How did this happen?

What kind of story did you go through to get here?"

As the prosecutor read out each person's charges, one by one, I kept thinking, "I could have predicted that."

"Can't it be easily prevented?"

Not because I knew criminal law, but common sense.

During my internship, I naturally remembered the faces of the courtiers, not because they were thugs, but because they were the people who came to me for help, but I let them go without reaching out.

In my sophomore year, I became a defense attorney paralegal, and I met a lot of young people who were accused of murder.

But even in the "worst" cases, there was humanity.

Every young person had a childhood trauma, was a victim in some way, experienced poverty, bereavement, dropped out of school, had early involvement with the police and the justice system, all of which led to the courts.

People convicted of murder were sentenced to life imprisonment, and while I was interviewing them, there was one thing that I couldn't understand: Why would you spend so much money to keep this person in prison for the next 80 years?

(Applause) In my junior year, I defended people with misdemeanor charges, mentally ill, homeless, drug addicts, all of whom needed help.

But we were sending them back without the help they asked for.

They were people who desperately needed our help.

But no hand was outstretched

People who don't know anything about the person who prosecute, defend, and judge

Seeing this horribly inefficient way of doing things made me want to pursue a career in criminal justice.

I saw so much unfairness that I wanted to be a lawyer.

I came to understand the dynamics and chose the path of prosecutor.

I'm not going to talk about all the problems

We all know that the criminal justice system needs reform, that there are 2.3 million people in prison or in prison nationwide, and that America has the highest number of incarcerated people in the world --

Add to that the seven million people on probation or on parole, and the fact that the criminal justice system affects only people of color, especially the poor,

It's also that the courts are busy because the system isn't working here and there.

It is the lack of preparedness of the corresponding prosecutors.

When we talk about criminal justice reform, as a society we focus on three things.

Complaints, online comments, protests, and we're talking about police, sentencing laws, and prisons.

The prosecution is almost never talked about.

In the fall of 2009, a young man was arrested by Boston police.

I was an 18-year-old African-American, a junior at a local public high school.

I wanted to go to college, but I couldn't save enough money to pay for a minimum-wage part-time job.

In a series of mistakes, he stole 30 laptops from a store and sold them online.

From there, he was caught and charged with 30 felony charges.

The boy was most afraid of being sent to prison.

What he barely understood was the damage his criminal record would do to his future.

One day, in the middle of an arraignment, I stumbled upon this case, and it may sound grandiose, but at that exact moment.

That boy Christopher's life was in my hands.

I was 29 years old, a new prosecutor, and barely aware of the impact that the decisions I was making would have on his life.

It was a serious case that deserved some treatment, but I just didn't think it was right to treat him like a felon for the rest of his life.

When most people become prosecutors, they are largely unaware of the impact their decisions have, regardless of their intentions.

Despite our wide discretion, we prosecutors have learned to be so risk-averse that our discretion is essentially useless.

As a result of the past, we mistakenly believe that our criminal justice system will make our actions more accountable and our world safer.

Internally and externally, we are measured by the number of convictions and the number of cases won, so there is little incentive to think outside the box and work when we are in a position to make decisions about how cases are handled and whether we take risks against defendants.

We're stuck in outdated ways that keep us from achieving the ultimate goal we all seek: a safer society.

If other prosecutors had been involved in this case, they would have prosecuted Christopher.

You barely realize the potential of what we prosecutors can do.

If prosecuted, Christopher would have a criminal record, which would make it harder for him to get a job, and it would start a vicious cycle that is part of today's dysfunctional criminal justice system.

Unemployed with a criminal record, Christopher will be unable to find a job, a career path, or a stable home.

Without these stabilizing elements of life, you're more likely to commit more serious crimes.

The more involvement he has with the judicial system, the higher the recidivism rate, and the more he will commit again and again, and again and again, which is a huge social burden on his children, his family, his peers.

Ladies and gentlemen, this poses a huge threat to the safety of society as a whole.

When I graduated from law school, I chose the path everyone takes.

I became a public prosecutor to do justice, but I didn't learn what justice is in class.

as anyone

And yet the prosecutor's office holds the most power within the criminal justice system.

It can be said that there is no limit

Most of the time, judges, police, legislatures, mayors, governors, presidents have no say in how the prosecution works.

It was completely up to me to decide whether or not to prosecute Christopher and give him a criminal record.

You can choose 30 felonies, 1 felony, 1 misdemeanor, or acquittal.

It was up to me to make a plea bargain or take the case to court, and ultimately I was in a position to send him to prison.

Prosecutors make these decisions every day without anyone interfering, and they are ignorant and uneducated about the serious consequences of their decisions.

One evening last summer, I was at a small town meeting for working men of color.

I'm just standing there, eating a little sandwich -- a civil servant -- (Laughter) -- a young man from across the room, smiling and waving, walks up to me.

It was a face I'd seen before, but I couldn't remember where it was when I was suddenly hugged.

and thanked

"Your kindness changed my life"

it was christopher

I didn't prosecute at that time.

He escaped trial and prison and had no criminal record.

Instead, I stood by him, taught him first how to judge what he had done, and then made sure he didn't make the same mistake again.

Together, we took back 75 percent of the computers we sold and put together a plan to raise money to return them to the store and reimburse us for what we couldn't return.

he was involved in community service

I wrote an essay about how this incident affects my future and society.

I applied to college, got financial aid, went to college, and graduated from a four-year college.

(Applause) When I saw the name tag, it was the manager of a big bank in Boston.

Christopher was successful, and he was making a lot more money than I was.

I can't say I owe Christopher his success, but I certainly helped him stay on the path to get there.

There are still thousands of young people like him, some in prison.

We need thousands of prosecutors who understand this fact and can protect them.

It's safer for the public to give them jobs than to convict them.

it's better for everyone

In retrospect, it made a lot of sense not to punish Christopher.

On the first day I met him in court, I saw him not as a criminal, but as a young man in need of intervention.

Having been caught selling large amounts of drugs in my late teens, I experienced firsthand the power of opportunity, stronger than the power of punishment in the criminal justice system.

As I moved forward, with the guidance and help of prosecutors, and with the help of probation officers and judges, I learned that prosecutors have the power to change lives, not destroy them.

That's the Boston way

I helped find a job for a woman who stole groceries to feed her children.

Instead of imprisoning an abused teenager for beating a classmate, they put him in psychiatric care and put him in a community mentor.

To survive on the streets, a runaway girl who was caught in prostitution needed a safe place to live and grow up, and it was something we could do.

Another boy was so afraid of being picked up by upperclassman bullies after school that he slipped a handgun into his backpack instead of a lunchbox one morning, and I didn't even give him a criminal record.

I usually spend months preparing for the trial, and I spent the time coming up with real solutions to the problems presented by the case.

Which is the better way to use your time?

How would you like your local prosecutor to use your time?

Rather than pouring $80 billion into a clearly dysfunctional prison industry, wouldn't it be better to put that money into education, into psychiatric treatment, into substance abuse treatment, into society, and make communities better?

(Applause) This is not someone else's business.

Because first of all, it's very expensive.

it's our money

In one state, it costs $109,000 to house a teenager for a year, and the chances of re-housing the same person in the same place is 60%.

A terrible return on investment

The second reason is that this is the right thing to do.

If prosecutors are part of the cause of the problem, it's up to us prosecutors to come up with solutions, using other areas where data and research are already available.

And third, because with your voice and your vote, these things can happen.

So next time there's a district attorney election in your area, ask any candidate: First, what will they do to keep people safe?

Second, what kind of data are you aggregating, and what kind of education are you giving prosecutors so that your policies are successful?

Third, if the system is not working for everyone, what corrective action would you take?

If you can't answer, you're not the right person for the job.

Each and every one of you who raised your hand at the beginning of this talk is a living proof of the power of opportunity, of the power of intervention, of the power of support, of the power of love.

Each and every one of you may have been punished for your mistakes, but few of you have needed a day in prison to get to where you are today, the man behind the world's greatest ideas.

Thousands of times a day every day, prosecutors across America wield a power powerful enough to wreak havoc, but that same power can create opportunity, interfere, support, and of course love.

These traits are the hallmarks of a strong society, and they're also hallmarks of a safe society.

If a society is broken, don't let the prosecutors of your choice fix it in an outdated, inefficient and expensive way.

Ask for more. Choose prosecutors who keep people away, not prosecutors who send people to jail.

ask for improvement

It's a right that you, your children, and those in the system are entitled to, but above all, it's a right demanded by the people we've sworn to protect and do justice to.

prosecutors must change

thank you

(Thank you for applause

(Thank you for applause

Indians are big families

I'm sure you've heard

It means that there are many gatherings of relatives.

When I was a kid, my parents used to take me to relatives' gatherings.

What I always looked forward to was playing with my cousins.

Whenever I played with my cousins, my uncle was there.

My uncle was a very successful man, confident and strong.

But then this strong, kind-hearted uncle fell ill with his health.

diagnosed with Parkinson's disease

Parkinson's is a disease that causes degeneration of nervous tissue, and he, who had been self-sufficient until now, suddenly found it difficult to even drink coffee because of the trembling caused by the disease.

My uncle started using walking aids to help him walk and turn, literally step by step, like this, for long periods of time.

And so, my uncle, who had always been the center of attention at family gatherings, suddenly became shy.

He hid himself from the pitying eyes of those around him.

There are many other people like him

60,000 people are newly diagnosed with Parkinson's each year, and that number is rising.

As designers, we hope that our designs can solve a multifaceted problem all at once, but that doesn't have to be the case.

When you focus on a simple problem and come up with a solution, it can end up having a big impact.

My goal is not to cure Parkinson's disease, but to simplify the hard work of people with Parkinson's disease and make a difference in the world.

The first thing I noticed was the tremor.

My uncle told me that after he got sick, he stopped drinking coffee and tea in public because he was too embarrassed, so I designed the Spillless Cup.

The secret is in this shape

Every time a shake occurs, the curve of the rim of the cup works to push the drink back inwards, so the drink doesn't squirt out as much as it does in a regular cup.

This cup isn't just for people with Parkinson's disease.

The point is that anyone can use it, including clumsy people like me.

This solved one problem, but there are many others.

All the time, talking to my uncle and asking questions, I realized that I was getting only superficial information or answers to my own questions.

But to have a new perspective, I needed more in-depth information.

So I decided to observe what he did every day, how he ate, how he watched TV.

When I saw him walking to the table, I was shocked. It's very difficult for him to walk on flat ground. What about climbing stairs?

Stairs in India don't have elaborate railings like in developed countries.

You must be able to go up and down the stairs on your own.

And my uncle said, "Let me show you how."

see what i see

It took me a long, long time to get here, and all the while I was thinking, "Oh my God, are you serious, Uncle?

Trying to go down stairs without a walking aid."

and···

(Laughter) And then I turned around and came back pretty easily.

Shocking, right?

i was shocked too

My uncle, who can't walk properly on a flat surface, walks smoothly when it comes to stairs.

I did some research and found that this was due to "sustained motion."

Other than my uncle, it seems that there are other people who suffer from the same symptoms and who use a walker, but when they ride a bike, they become "sustained exercise" and the symptoms go away.

So I focused on trying to recreate the feeling of going up and down stairs on a flat floor.

After trying a lot of ideas with my uncle, here's what finally worked.

(Laughter) (Applause) You're walking faster now, aren't you?

(Applause) I call this the illusory staircase.

"Freezing legs" are common. Why not paint an "illusory staircase" all over the room to help them feel more confident?

Technology is not the only solution

What we need is a human-centered solution.

It's easy to make the illusory staircase a projection type, Google Glass, etc.

But I stuck to the simple print method.

When this is implemented in hospitals, Parkinson's patients will feel more welcome.

I want every Parkinson's patient to feel what my uncle felt that day.

He told me that thanks to me, he seems to be back to his old self.

In this day and age, the word "smart" has become synonymous with advanced technology, and the world is getting smarter every day.

Can't we make "smart" simple but effective?

All it takes is a little bit of empathy and some curiosity to go out there and observe.

But don't stop there

Find complicated issues and face them without fear

Break it down into smaller problems, boil it down, and find a simple solution to it.

Then try that solution, fail if necessary, and use your new insight to make it better.

Imagine what we could do if everyone found a simple solution.

What would the world be like if we combined the simple solutions for everyone?

Let's create a smarter world the simple way

thank you

(applause)

Can you really do things as well as you think you do?

How good are you at managing money?

How about gauging people's feelings?

How healthy do you think you are compared to other people you know?

Do you think your grammar is better than average?

Knowing how competent you are compared to others is more than boosting your self-esteem.

It helps you decide whether to follow your own judgment and intuition, or whether to ask someone for advice.

But psychological research shows that we're not very good at evaluating ourselves accurately.

In fact, we often overestimate our own abilities.

Experts call this phenomenon the "Dunning-Kruger effect."

It explains why people have the illusionary advantage that over 100 studies show.

The degree to which we consider ourselves superior to others contradicts the laws of mathematics.

When we asked software engineers at two companies to rate their performance, 32% at one company and 42% at the other said they were in the top 5%.

Another study found that 88% of American drivers believe their driving skills are above average.

This is not an uncommon story

People tend to rate themselves higher than most other people, and this can be seen in many aspects, from health to leadership to ethics.

And one of the most interesting things is that people with lower abilities tend to overestimate their own abilities.

For example, people who are markedly inferior in areas such as logical reasoning, grammar, knowledge of money, mathematics, emotional intelligence, performing clinical tests, and chess tend to rate themselves as experts.

What kind of people are prone to such delusions?

Unfortunately, everyone, because we all have a side of incompetence that we don't recognize.

But why?

When psychologists Dunning and Kruger first wrote about this effect in 1999, they pointed out that those who lack knowledge or skill in any domain are doubly cursed.

First, they make mistakes and make poor decisions.

Second, that same lack of knowledge makes us fail to see our own mistakes.

In other words, a bad person lacks the strength necessary to recognize how bad they are.

For example, when researchers looked at participants in a college debate competition, the teams in the bottom 25 percent of the preliminary rounds lost nearly four out of five games.

They thought they were winning 60% of the time.

If you don't have a firm grasp on the rules of debate, you won't know when or how often your arguments fall apart.

The Dunning-Kruger effect isn't about blinding yourself to your weaknesses because of your ego.

When people find fault with themselves, they usually admit it.

In one study, students who initially performed poorly on logic puzzles, after taking a logic mini-course, were willing to admit their previous performance was terrible.

This might explain why people with some experience and skill are less confident in their abilities.

They know enough to know there's a lot they don't know

While experts know how much they know

Another common mistake is to assume that everyone else knows as much as you do.

As a result, people, whether incompetent or highly skilled, are trapped in inaccurate self-perceptions.

Low-skilled people can't see their own shortcomings

Highly talented people don't realize how unusual their abilities are.

If the Dunning-Kruger effect is invisible to the person who experiences it, how do we know how good we really are in some way?

First, seek feedback from others and consider it, even if it hurts your ears.

Second, and more importantly, keep learning.

The more knowledge you have, the less likely it is that you'll have hidden gaps in your abilities.

Maybe it all comes down to the old saying, "When arguing with a fool, make sure he doesn't do the same."

This is the story of how we get knowledge.

The star of the story is this woman, Natalia Rybczynski.

I'm a paleontologist who specializes in digging up ancient carcasses.

(Voice) Natalia Rybczynski: I had people call me Dr. Corpse.

Latif Nasser: I found it particularly interesting because the excavation site is in the remote Canadian tundra, far north of the Arctic Circle.

One day in the summer of 2006, she was at an excavation site called Fil's Reef Bed, less than 10 degrees latitude from the magnetic North Pole.

(Voice) Natalia: You might think it's boring, because you're just walking around all day with a backpack, a GPS, a notebook, picking up fossils.

Latif: One day she realized something.

(Voice) Natalia: An old auburn thing the size of a palm.

I was on the ground

Latif: At first, I thought it was just a piece of wood, because we often find fragments of ancient plants in the Files leafbed.

But that night I returned to camp—

(Voice) Natalia: I took out my magnifying glass and looked a little closer, and there weren't any rings.

Maybe it's the state of preservation, but the more I look at it, the more —

was a bone

Latif: Over the next four years, she visited this site again and again, and ended up collecting 30 of the same bone fragments, most of them very small.

(Voice) Natalya: Not many. They fit in a small plastic bag.

Latif: I tried to put the pieces together like a puzzle.

it was really hard work

(Voice) Natalia: It's cracked and shattered, so I've tried using sand and putty, but it doesn't work.

So I ended up using a 3D scanner.

Latif: Great! Natalia: Right?

(Laughter) Latif: It's much easier to work on the screen.

(Voice) Natalia: I was kind of blown away when it all came together.

Latif: How confident were you that the assembly was correct?

Could it be different if you put it together differently? Was it actually a parakeet?

(laughs) (voice) Natalia: No, definitely.

Latif: What she found was a tibia, a leg bone, and it was from an artiodactyl, a relative of cattle and sheep.

But this bone couldn't have been from a cow or a sheep.

it was too big

(Voice) Natalia: It was oversized. It's a very big animal.

Latif: What kind of animal was it?

Frustrated, she showed one of the bone fragments to a colleague in Colorado, and then she had an epiphany.

(Voice) Natalia: When we cut the ends of the bones with a saw, there was a distinct smell.

Latif: Smells like burnt meat

It smelled just like Natalia smelled when she cut off her skull in the creepy dissecting room: collagen.

Collagen plays a role in maintaining bone structure

It usually decomposes over time, but

In this case, the Arctic climate acted as a natural refrigerator to preserve it.

A year or two later, when Natalia was attending a conference in Bristol, a colleague of mine named Mike Buckley was demonstrating a new process called "collagen testing."

Each animal has a slightly different structure of collagen, and if we can identify the collagen in an unknown bone, we can compare it to that of animals we already know, and maybe even identify it.

That's why I sent you one bone fragment, by courier.

(Voice) Natalia: I wanted to track it down because it's important.

(Laughter) Latif: He processed the bone fragments and compared them to 37 modern mammals.

found a matching animal

Who is the owner of the 3.5-million-year-old bone that Natalia unearthed in the high-latitude Arctic Circle?

was a camel

(Laughter) (Voice) Natalia: I was like, "Huh?"

Latif: We've tested many bone fragments, and they all yielded the same results.

However, based on the size of the bones they found, this camel was 30 percent larger than its current counterpart.

It was about 2.7m tall — and weighed about a ton.

(noisy) That's right

What Natalia discovered was a "giant Arctic camel."

(Laughter) When you think of camels, what comes to mind is the Bactrian camel of East and Central Asia.

The picture in your head is probably this dromedary camel. When you think of desert creatures, it's this one. It lives in hot deserts like the Middle East and the Sahara.

How on earth did such an animal reach the Arctic Circle in northern Canada?

In fact, scientists have known for a long time, even before Natalia was discovered, that camels actually originated in the United States.

(American national anthem) (Laughter) I was born here.

Camelids have been around for about 45 million years, but for almost 40 million of them, they've been in North America alone, with about 20 different species, maybe more.

(Voice) Latif: Can you tell the difference when you put them all side by side?

Natalia: Yeah, they're all different sizes.

Some had very long necks, similar to the necks of giraffes.

Latif: Some had faces that looked like alligators.

(Audio) Natalia: Early primitive camels were very small, about the size of a rabbit.

Latif: Eh? Is it a camel the size of a rabbit?

(Voice) Natalia: Early kind.

You can't tell by looking

Latif: I want to raise rabbits and camels.

(Voice) Natalia: Yeah it must be great

(Laughter) Latif: Then between three and seven million years ago, herds of camels migrated down to South America, where they became llamas and alpacas.

At the end of the last ice age, North American camels became extinct.

That's all we know so far, but that doesn't fully explain why it was found so far north.

For example, in terms of temperature, it's the complete opposite of the Sahara Desert.

Indeed, 3.5 million years ago temperatures were on average 22 degrees warmer than today.

So it might have had coniferous forests, much like the Yukon Basin and Siberia today.

But even then, winter would last for six months, and the pond would have frozen over.

if there is a blizzard

There would have been times when the night was dark for 24 hours.

then the whole

How did this Sahara desert superstar survive the Arctic climate?

(Laughter) Natalia and her fellow scholars think they've found the answer.

And it's a great answer

What if the characteristics of camels that we've thought of as adapting to places like the Sahara actually evolved to help them survive the winter?

What if wide feet aren't meant for walking on sand, but on snow like snowshoe?

The hump on my back -- I didn't know it, and I was surprised -- it's not filled with water, it's filled with fat.

Then, some time after crossing the overpass, what if the winter features were useful in a hot desert environment?

Humps, for example, may be useful in hot climates, because if you store all your body fat in one place, like a backpack, you don't have to cover your entire body with fat that acts as an insulator.

It makes it easier for the heat to escape

With this crazy idea, what was once thought to be prime evidence of desert adaptation can actually be evidence of once living in the high Arctic.

I'm not the first to tell this story.

Others have used this story to tell the wonders of evolutionary biology and to help us understand future climate change.

But I love this story for another reason

For me, this is a story about ourselves, about our view of the world and how it changes.

I was educated as a historian.

What I've learned is that scientists are mostly historians, too.

they also try to understand the past

It tells the history of life in the universe, the planets, and the earth.

And as a historian, we start by thinking about how the story unfolds.

(Voice) Natalia: We make stories and stick to them, like the story of camels in the desert.

It's a very good story. Camels are perfectly adapted.

I'm in the desert all the time

Latif: But maybe someday we'll find a little piece of evidence.

Understanding small things can lead you to reassemble everything you believed.

In this case, too, one scientist's discovery of a piece of wood-like fossil has led science to come up with a whole new, unconventional hypothesis about why this animal from a Dr. Seuss picture book looks the way it does.

Changed the way I think about camels

I've changed from seeing them as very special animals that can only adapt to the specific environment of the desert, to seeing them as animals that happen to be in the Sahara Desert but can actually travel the world and live anywhere.

(Applause) This is Azzurri.

hi azurhi hello

look, eat

(Laughter) Azzurri usually performs at Radio City Music Hall, but he's on a break.

(Laughter) I'm not kidding.

Now, this azure is living proof that stories about our world are dynamic.

we have to reframe the story and reimagine it

(laughs) Right? Azure

There's a new way of looking at the world beyond a piece of bone.

thank you

(applause)

In the summer of 1997, NASA's Mars Pathfinder spacecraft landed on Mars and began sending back to Earth amazing photographs of the Martian surface.

But after a few days something went wrong

Sending was interrupted

Pathfinder was, in effect, procrastinating, working hard and missing out on the most important task.

What was happening?

I found a bug in the scheduler

The operating system has something called a scheduler that tells each task how much time to give the CPU and what task to switch to next.

When things are going well, computers switch between tasks so smoothly that it seems like everything is happening at the same time.

We all know what happens when the gears of something go wrong.

This will at least give some comfort

Even computers can be overwhelmed with work.

By studying the science of scheduling, we may be able to get some hints on how to solve our human time woes.

The first wisdom is that the time you spend prioritizing work is the time you don't perform work.

For example, let's say that when you check your inbox, you're going through all your emails and choosing which ones are the most important.

Once you've processed that email, do the same thing again.

It makes sense, but there is one problem.

So this is what's known as the squared-time algorithm.

If you have twice as many emails in your inbox, you're doubling the length of the traversal and doubling the number of traversals.

That's four times the amount of work.

Back in 2003, a Linux programmer faced a problem similar to this.

Linux ranks each task in order of importance, and sometimes more time was spent ranking tasks than doing them.

The counterintuitive solution that programmers came up with was not to rank the tasks outright, but to divide them into a small number of prioritized groups. The loss of precision in what to do next is outweighed by the benefits of having more time for practical work.

If you're too obsessed with always handling your most important emails first, you may be bankrupt.

You might wake up with three times as many emails in your inbox and take nine times as long to clear.

It might still work better to reply in chronological or even random order.

Surprisingly, giving up trying to do things in perfect order can be the key to getting things done.

Another problem that computer scheduling can help us with is the interruptive work that is part of modern life.

When the computer switches from one task to another, it performs a "context switch," recording where the original task left off, and replacing the data in memory with that of the new task.

This switch comes at a cost

What this teaches us is that there's an inherent trade-off between productivity and responsiveness.

We need less context switches to get serious work done.

Responsiveness, on the other hand, means that when something happens, you can react immediately.

These two aspects are in fundamental conflict.

Recognizing this conflict can help us better decide how to balance it.

The obvious way is to minimize the interruption of work.

Less obvious is the grouping of interrupt work.

Respond to notifications and emails within an hour If it's not urgent, check once an hour, no more.

In computer science, we call this idea "interrupt coalescing."

Stop responding every time something happens, oh my mouse moved

the keyboard is pressed

Interrupts like file downloads and such are grouped according to how long they can wait.

In 2013, thanks to interrupt coalescing, laptop battery life improved significantly.

By delaying the interrupt, we can do a lot of checks at once and quickly return to a low power state.

This works as well for humans as it does for computers.

Doing something similar can help you regain your attention and maybe even give you something that modern life lacks: rest.

A mosquito landed on your arm, injected chemicals into your skin, and started sucking blood.

If you don't see bright red, itchy bumps, you wouldn't know there was a mosquito there.

It's a nasty bulge, but it's also an important sign that you're protected by your immune system, which acts as a vital guard against infections and illnesses big and small.

This system is a vast network of cells, tissues and organs that work together to protect our health from all threats.

Without this system, you're exposed to countless bacteria, viruses, and toxins, and even the smallest of things, like a cut or a seasonal cold, can be deadly.

The immune system relies on millions of blood cells — white blood cells — for defense, and they're made in the bone marrow.

White blood cells enter the bloodstream and lymphatic system where they help remove toxins and waste from the body.

We have a large number of white blood cells in our bodies - 1 microliter of blood contains between 4,000 and 11,000 white blood cells.

White blood cells circulate through the body, like security guards, constantly scanning blood, tissues, and organs for signs of disease.

The main clues that this system uses are antigens.

Molecular signatures on the surface of these pathogens or foreign substances indicate the presence of an intruder.

As soon as the white blood cell finds it, within minutes, it sets off the body's defensive immune response.

There are many different types of threats to our bodies, and our immune response must be adapted to each one.

This means that we rely on different types of white blood cells to defeat threats in different ways.

Apart from this diversity, we divide white blood cells into two main groups of cells, which work together to carry out a two-pronged attack.

First, it initiates an immune response by sending phagocytic cells, macrophages and dendritic cells, into the blood.

As they circulate, they destroy any foreign cells they come across by simple phagocytosis.

This helps the phagocytic cells to identify the antigens of the invaders that have just been ingested, and directs the defense by sending this information to the second major group of cells, the lymphocytes.

T cells, a type of lymphocyte, seek out infected cells in the body and quickly kill them.

Meanwhile, B cells and helper T cells use the information gleaned from each invader's unique antigens to start making specialized proteins called antibodies.

In essence, each antigen produces its own unique, tightly binding antibody, like a lock and key, that destroys the invading cells.

B cells can produce millions of different antibodies that circulate throughout the body and attack invaders until the worst threats are overwhelmed.

The familiar symptoms that appear while all of this is going on, such as increased temperature and swelling, are in fact processes designed to support the immune response.

Hyperthermia is a difficult condition for bacteria and viruses to reproduce and spread, because they are sensitive to temperature.

When body cells are damaged, they release chemicals that leak fluid into the surrounding tissue, causing swelling.

It also attracts phagocytic cells, which phagocytize invaders and damaged cells.

The immune response usually kills off pathogens in a matter of days.

This doesn't mean you won't get sick, and that's not the purpose.

The actual job of the immune response is to stop threats from building up to dangerous levels in our bodies.

And through constant surveillance, the immune system provides another benefit: building a long-lasting immune state.

Once B cells and T cells identify an antigen, they can use that information to recognize future invaders.

So when the threat reappears, the cells are able to quickly produce the appropriate antibodies before it has any effect.

This creates a state of immunity against certain diseases, such as chickenpox.

But it doesn't always work out that way

Some people have autoimmune diseases, which trigger the immune system to attack its own healthy cells.

No one knows exactly what causes these diseases, but to varying degrees, these diseases disrupt the immune system and lead to arthritis, type 1 diabetes, multiple sclerosis, and more.

But many people's healthy immune systems successfully fend off an estimated 300 colds and countless potential infections in their lifetimes.

Without this, those threats would have grown even more dangerous.

So the next time you catch a cold or get bitten by a mosquito, think about your immune system.

Because you saved my life

I'm from the most liberal, tolerant, and progressive place in America—Seattle, Washington.

I grew up in a wonderful Seattle family.

My mother is an artist, and my father is a university professor.

I didn't really go down the path my parents envisioned.

I dropped out of college when I was 19—I don't care if I dropped out or dropped out.

(Laughter) And then I started touring as a professional horn player, something I'd always dreamed of.

While performing chamber music, I traveled all over the United States and Europe, working with the great jazz guitarist Charlie Byrd for several years.

And in my late twenties, I even became a member of Spain's Barcelona Symphony Orchestra.

what a good life

my parents never complained

you've been supporting me for a long time

It wasn't their ideal.

He told his neighbors and friends, "My son is in the midst of a gap year -- about ten years."

(Laughter) But -- I had one awkward conversation about the way I lived my life, so let me tell you.

I was 27 years old, and I was traveling home from Barcelona, ​​home for Christmas, and I was alone with my mother in the kitchen, cooking together.

My mother is taciturn and too taciturn—

I thought something was wrong

When I asked, "Mom, what are you thinking?"

Mother said, "We are very worried about you."

"What do you mean?"

"You must be honest with me — you didn't vote Republican, did you?"

(Laughter) Now, the truth is, I was just a horn player with no interest in politics.

There was a little realization, and my parents who sensed it were a little confused.

I had become a staunch supporter of capitalism, and I'll tell you how.

It stems from something I've always been interested in, which may come as a surprise, but poverty.

I remember seeing real poverty for the first time as a kid in Seattle.

My family was lower-middle-class, but certainly not really poor.

it was far from

The first time I saw poverty and poverty was in the early '70s, when I was six or seven.

It was an ordinary experience, just like everyone else experienced.

Here's a picture from National Geographic of a kid my age in East Africa with flies on his face and a distended belly.

I knew it was over, but there was nothing I could do.

Some of you may remember that picture, not the same picture, but a similar one.

It was a photograph that showed the Western world the picture of poverty that continues to plague the world.

That picture stuck in my mind, and even as I grew up, went to school, dropped out, went back to school, and started a family, I still couldn't forget it.

I wondered what happened to that child

I wonder what happened to people like him all over the world

So I started researching, I wasn't in college at the time, but I was looking for answers. What happened to the poorest people in the world?

Did it get worse, did it improve, what happened?

And I found the answer, and it changed my life, and I'll share it with you.

Now -- most Americans think poverty has gotten worse since childhood -- I think it's gotten worse than it was in that picture.

If you ask Americans whether global poverty has gotten worse or better, 70 percent will say that hunger has gotten worse since the early '70s.

let me tell you the truth

This is the enlightenment that changed my view of the world

Between 1970 and today, the share of the world's population living in hunger -- people living on less than a dollar a day -- adjusted for inflation, of course -- has dropped by 80 percent.

Worst poverty in the world is 80 percent less than it was when I was a kid. I didn't even know that.

everyone this is a miracle

it is to rejoice

It's the greatest feat in human history against poverty, and it happened in our generation.

(Applause) When I saw this, it made me wonder, what did it take to achieve this?

If you don't know why it happened, you can't reproduce it, can you?

If I wanted to replicate this and lift two billion more people out of poverty, because that's what I'm talking about, from the time I was a child until now, two billion of our brothers and sisters, the "minor ones" in the Bible, have been lifted out of poverty.

I want to know in order to save another 2 billion people.

So I started looking for answers

The answer had nothing to do with politics, it didn't matter to me

I'm still not interested

I wanted the best answers from mainstream economists, right or left or centrist.

say the answer

Five factors for success

To date, 2 billion of our brothers and sisters around the world have been lifted out of poverty

The first is globalization

The second is free trade.

The third is property rights.

Fourth, the rule of law

The fifth is entrepreneurship

Since the 1970s, the world has become free enterprise.

But I'm not simple either

We know free enterprise isn't perfect, and we know we need more than free enterprise to build a better world.

but it's amazing

It's a problem that goes beyond politics

What I learned What I realized

Capitalism is about more than just accumulating wealth.

The best thing about capitalism is that it's ambitious. A lot of people on this stage talk a lot about ambitions, ambitions that come from aspirations, and are very much tied to free enterprise.

We must spread this will

Now let's talk about the second enlightenment, which is related to the first enlightenment, the one that brings progress not only in the world, but also in this city where we are.

I've never heard someone say this, but the one that best sums up the idea of ​​poverty relief that I just told you about is this: "No institution in human history has created more wealth than the free market.

We have lifted billions of people out of poverty.”

Whose words?

Sounds like Milton Friedman or Ronald Reagan.

wrong

It's President Barack Obama

Why can you say it out of the blue?

because he was directly told

you won't believe

What came out of my mouth was "Banzai!"

And in addition to that, I thought, "What a great opportunity."

Do you know what I was thinking?

In May 2015, during an event on this topic at Georgetown University.

I thought this was the solution to the biggest problem facing America, what?

It's about reaching out to those who need us most, liberals and conservatives alike, with the idea that the free market is the solution to poverty.

I'm sure you all know without a word that the crises in America and around the world are due to political polarization.

We've now reached a critical point of crisis.

This is an unpleasant situation.

Last year, a paper was published in the Proceedings of the National Academy of Sciences, the most prestigious scientific journal in the Western world.

In a 2014 paper, the topic was "political motive asymmetry."

What this means is that, according to the psychologist's definition, we assume that our own ideology is born out of love, but our enemy's worldview is born out of hate.

common in world conflicts

For example, we see a phenomenon between Palestinians and Israelis.

What did the authors of this paper discover? In America today, the vast majority of people, both Republicans and Democrats, are trapped in a mentality of political motivation asymmetry.

In America today, the majority of politically conscious people believe they are driven by love and the other is driven by hate.

think about it

Most people think, "My ideology is based on very basic tolerance. I want to help people, but other people are the bad guys trying to get me down."

As long as we have this kind of asymmetry, we can't move forward as a society.

Impossible

So what's the solution?

First, let's be honest. Differences are normal.

Don't underestimate the differences, it's not that simple.

There's a lot of good research on this

My friend and veteran TED speaker, Jonathan Haidt,

I'm a professor of psychology at New York University.

I study the differences in ideologies, values ​​and morals of different people.

He says that conservatives and liberals, for example, have very different views on what matters.

For example, according to Haidt, among liberals, 59 percent more people care about poverty than those who value economic freedom.

Conservatives are 28% more likely to value economic freedom than those who care about poverty.

It seems that this difference will not be reduced

Incompatible? That's wrong

This is diversity, and that's where our strength lies.

Do you remember what saved the poor?

It was an obsession with the problem of poverty that spread around the world by means of the free economy.

So we need each other, if we want to lift the next two billion people out of poverty and help people.

there is no other way

Now

How can we achieve this?

it's difficult

We need innovative thinking

There are many on this platform

Social Entrepreneurship—Yes, Absolutely, It's Great

We need sustainable, ethical, moral and responsible foreign investment—

Exactly! But what do you really need?

It's a new world with flexible ideologies.

need more surprises

right?

Have you ever felt that your ideology had become a mold?

Is it mundane?

Do you feel like you're only listening to people who share the same opinion as you?

Why is this dangerous?

Because when you talk about the economy in this country, you have the conservatives on the right side who talk about taxes and regulations and big government.

On the left are liberals, and whenever we talk about the economy, it's about income inequality.

Both are important.It's really important to me and to you.

This gets in the way when it comes to lifting people out of poverty who are hungry and need help today.

We need to work together with the best tools at our disposal and the best ways to alleviate poverty. And that's only possible if we both recognize that conservatives need liberals and their poverty obsession, and liberals need conservatives and their free market obsession.

This diversity will be one of America's strengths going forward, if we embrace it.

So how can we do this together?

I need a list of activities, not only for you, but for myself.

Number one -- item number one. Please remember that it's not enough to just tolerate people who disagree.

that's not enough

You should keep in mind that you need people who don't agree with you, because there are people who are still waiting for these tools that our diversity can provide.

Now what should I do, how should I tell

where does it start here

All of us in this room, we are blessed.

Blessed are those who listen

Blessed with success and leadership

If you talk about an ideology you never thought of, they might listen.

Progress may start there

That's the first, then the second

I want you to be, and I have a person I want to be, especially someone who can blur boundaries.

Conservatives who always talk about poverty, who talk about their moral duty to fight for the poor

If you're a liberal, you're a liberal who always talks about the goodness of the free market when used responsibly to solve our problems.

It does two things

Number one, we can start helping the next two billion people, and we'll be able to work on ourselves to find the solutions that we'll need in the future, as we've seen a lot in the past.

Second, we can turn the terrible and sacred ideological battle that we're going through in this country into a competition of ideas based on solidarity and mutual respect.

And then maybe, maybe, we'll find that what we think is the big difference isn't that big after all.

thank you

(applause)

Hannah was looking forward to going to college.

I couldn't wait to move out of my parents' house, be on my own, and join new friends.

I went to a college party one night and saw him having a crush on him.

Shall we call you Mike

The next day, Hannah woke up with a throbbing headache.

I remember last night only intermittently

I remember throwing up in the hallway in front of Mike's room and staring in silence at the wall while he was inside her and walking home shivering and staggering to stop.

This was a bad experience for her, but she also thought, "But maybe this is what college sex is like?"

In the United States, one in five women and one in 13 men will be sexually assaulted at some point in college.

Less than 10% of those victims report to the school or the police.

It takes an average of 11 months to report

At first, Hannah thought she could handle what happened to her alone.

As I watched Mike walk the girls from the party to his room, I worried about them.

After graduating, Hannah found out that she was one of five people that Mike did exactly the same.

And this is not at all implausible, because 90 percent of sexual assaults are by repeat offenders.

But at such a low reporting rate, even repeat offenders are highly unlikely to be reported, and even if they do, nothing can be expected.

In reality, only 6% of perpetrators of assaults reported to police end up in prison.

In other words, the chance of escaping is 99%

It means that there is virtually no deterrent to these crimes in America.

I was trained as an infectious disease epidemiologist.

I'm interested in systems and networks where we can put our resources to good use.

So I see sexual assault as a tragic but solvable problem.

A few years ago, when college assaults began to make headlines, I felt like I had a once-in-a-lifetime opportunity to make a difference.

and it moved

I started talking to victims at college.

What they wanted in college was something very simple: a website that they could use anytime, anywhere, when they needed it, with clear reporting options, and they weren't sure if they would believe the initial process, so they could report the assault on a computer instead of talking to someone.

Has the ability to create a protected, time-stamped document of the incident as evidence even if you haven't decided to report it yet.

Finally, but most importantly, there's a feature that allows you to configure that assaults will only be reported if someone else has entered the same perpetrator.

Everything changes when you know you're not the only victim.

It changes the way you perceive what you've experienced, and it changes the way you think about the perpetrators, which means that if you do report a victim, there are people supporting you, and they have you.

We actually created a website to do this, and it went live on two college campuses in August.

We built in a unique matching system. Suppose Mike's first victim reports, saves the record, goes to the matching system, creates a file for Mike, and Mike's second victim does the same thing a few months later.

If a system like this existed for Hannah and her classmates, they would most likely have called it in. You would have believed me, and Mike would have been thrown off campus, in jail, or at the very least getting the help he needed.

If repeat offenders like Mike could have been stopped when their second offense matched, victims like Hannah must have never been victims in the first place.

By stopping recidivism early, 59 percent of sexual assaults can be prevented.

Because we've created an effective deterrent to assault, perhaps for the first time, Mike in the world will never try to assault anyone again.

The system I'm describing, the type of system that victims want, is an information escrow, a database where your information is stored and only sent to third parties when pre-agreed conditions are met, like a "match system."

The application we launched was for college campuses.

Similar types of systems are available in the military and in the workplace.

We don't have to live in a world where 99% of rapists can get away with it.

We can create a world where those who have done wrong are held accountable, where victims get help and justice, where authorities get the information they need, and where those who violate the rights of others are deterred.

thank you

(applause)

In college, I majored in politics, so I had to write a lot of papers.

If a normal student writes a report, the workload would be distributed like this.

This is -- (Laughter) it's slow in the beginning, but you've made good progress in the first week, and in the second half, it's a little more stressful, but it's still organized.

(Laughter) I would love to do something like that.

as planned

I'm going to start working on it right away, but when it comes time to actually do the report, in my case, it looks like this.

(Laughter) This happens every time.

I was then asked to write a 90-page dissertation, which should be written over the course of a year.

I knew the usual way of doing things wouldn't work.

too big

So I made a plan and decided to do it like this.

one year plan

It feels like a gentle staircase with a light start, a slight rise in the middle, and a spurt at the end.

going up these stairs

it won't be difficult

but something funny happened

the first few months

I came and passed, but I couldn't do anything

So the plan will change

(Laughter) And then -- (Laughter) the middle period is over, but I can't write, and I'm like this.

Two more months became one month, and then two more weeks.

I woke up one morning with only three days left until the deadline. (Laughter) I hadn't written a word yet, and I had no choice. I had to write a 90-page paper in 72 hours, and I stayed up two nights in a row.

I thought it was all over

A week later, I got a call from the university.

"Are you Tim Urban?"

"yes"

"I would like to talk to you about your submitted paper."

"Yes"

And he said, "I've never seen a graduation thesis like that."

(Laughter) (Applause) That didn't happen.

(Laughter) It was an absolutely terrible paper.

(Laughter) I just wanted everyone to think, "He's a genius, isn't he?"

(Laughter) It's an absolutely terrible paper.

Now I'm a writer with a blog called "Wait But Why."

About two years ago, I decided to write about procrastination.

My behavior was always confusing people around me, so I wanted to explain to the non-procrastinators of the world what's going on in the minds of procrastinators and why we are the way we are.

I think there must be a difference between the brain of a procrastinator and the brain of a non-procrastinator.

To confirm that, I decided to find a place that would take MRIs of my brain and the brains of people who were definitely not procrastinators, and compare them.

I'm bringing the results here today.

I want you to look carefully to see if you can tell the difference.

Unless you're a brain expert, it's hard to tell the difference, but anyway, take a look.

This is the brain of a non-procrastinator.

[Rational decision maker] (laughter) Against this

my brain —

[The monkey wants a reward right away] (laughs) That's the difference between the two.

Both brains have a rational decision maker, but the procrastinator's brain also has an immediate reward monkey.

What does that have to do with procrastination?

All is well until this happens

"You'd better get some work done." "No." Rational decision makers make rational decisions to do something productive, and monkeys don't like it.

(Laughter) And then — (Laughter) I have to go check the fridge and see if anything has changed in the last 10 minutes.

After that, a YouTube spiral awaits, starting with a video of Richard Feynman talking about magnets, all the way up to an interview with Justin Bieber's mom much later.

(Laughs) I'm so full for the time being, sorry, but I don't have the time to get any work done today."

(sighs) What's going on?

A monkey is not someone you want at the helm.

i live only in the present moment

No memory of the past, no knowledge of the future, only two things to worry about: easy and fun

In the animal world, that's fine.

If you're a dog, doing nothing but easy and fun things all the time would be a very successful way of life.

(Laughter) To monkeys, humans are just another animal.

All we have to do is eat well, sleep well, and give birth to the next generation.

I'm not living a primitive life now.

We're in an advanced civilization, but monkeys don't know what that is.

That's why we have another person in our brain, the rational decision maker, who gives us abilities that other animals don't have.

we imagine the future

can see the big picture

can plan for the long term

A rational decision maker takes everything into account

I'm trying to get you to do what you have to do now

Sometimes it makes sense to do something easy and fun, like dinner time, sleep time, or leisure time.

both have some overlap

sometimes we agree

But in the big picture, sometimes it makes sense to do something that's harder and less fun.

That's when conflict arises.

If you're a procrastinator, this conflict will always tend to end up in a certain way, and you'll spend a lot of your time in the area highlighted in orange, something that doesn't make sense to do, it's easy and fun.

I call this realm the "dark playground."

(Laughter) The playground of the dark — a place all procrastinators know well.

It's a place you'll play when you're not

Fun in the Dark Playground isn't actually fun. It's fun you shouldn't have, and it's filled with familiar feelings of procrastination: guilt, fear, anxiety, and self-loathing.

The question is, with the monkey at the helm, how can the procrastinator move into the blue realm, where the less comfortable but really important things happen?

In fact, procrastinators have a guardian angel who's always watching over them, even in the worst of times, and it's called the "panic monster."

[Panic Monster] (Laughter) Panic Monster sleeps most of the time, but when a deadline is approaching, it's embarrassing, or a terrible outcome is approaching, such as a career crisis, it suddenly wakes up.

The point is, that's the only thing monkeys fear.

Most recently, I was indebted to him, six months ago, when the people at TED contacted me and invited me to do a TED talk.

(Laughter) Of course I said, "I will."

It's been a lifelong dream of mine to be able to say, "I've done a TED Talk before."

[I've done a TED talk.] (Laughter) (Applause) In the midst of all this excitement, rational decision makers have other things on their minds.

"Do you know what you accepted?

Do you know what will happen one day in the future?

Sit down now and get started! ”

The monkey responds, "I totally agree, but for now, if you open up Google Earth, zoom in on the bottom edge of India to 60 meters above the ground, scroll for two and a half hours, and go all the way to the top edge, you might get a better idea of ​​what India looks like."

(Laughter) And that's what I did for the rest of the day.

(Laughter) Six months turned into four months, turned into two months, turned into one month, and TED released the list of speakers.

I opened the page and there was my face staring back at me

So who woke up?

(Laughter) Panic Monster went frantic, and soon the entire system was in chaos.

(Laughter) Remember that monkeys are afraid of panic monsters, so they run off into the trees.

Now that the rational decision maker was finally in control, I started preparing my talk.

The Panic Monster can explain the erratic behavior of procrastinators, and a person who spent two weeks unable to write the first line of a report miraculously wakes up to a strong work ethic and spends an entire night writing eight pages.

So this is the whole situation with the three characters, the procrastinator system.

It's not pretty, but it works in the end.

This is what I decided to blog about two years ago.

When I wrote it, I was surprised by the reaction to my blog.

Literally thousands of emails came in from all over the world, from so many different people.

nurses, bankers, painters, engineers, and so many graduate students.

(Laughter) They all said the same thing: "I have the same problem."

But the lightness of that blog post contrasted with the weight of the email I received.

It was written with intense frustration at the effect procrastination was having on their lives, and what monkeys were doing to them.

It made me think, "How is the procrastinator's system working?"

Why are they in such a gloomy state?

It turns out that there are two kinds of procrastination.

In the example I was talking about, there was a deadline.

The effects of procrastination are short-lived and the panic monster emerges.

But there's another kind of procrastination, and it doesn't have a deadline.

For entrepreneurial work, like a sole proprietorship or an artist, there are no deadlines in the beginning, because nothing happens until you go out and do something and get on track and start running.

Also, there are many important things outside of work that don't have deadlines, like visiting family, exercising and staying healthy, building relationships, and ending a broken relationship.

If Panic Monsters were the only mechanism for procrastinators to do these difficult things, it would be problematic, because Panic Monsters don't show up in situations where there are no deadlines.

There is no awakening, the effects of procrastination are unbounded, and you will continue to procrastinate indefinitely.

That kind of long-term procrastination is less visible and less talked about than procrastination with ridiculous, short-term deadlines.

I usually end up being tormented quietly by myself

It can be a source of great long-term unhappiness and regret.

I thought that's why they wrote the email and why they're in such a bad situation.

I'm not stuck in any project

Long-term procrastination makes you feel like a bystander in your life.

Their frustration isn't that they can't achieve their dreams, it's that they can't even start chasing them.

When I read those emails, it struck me that nobody is a procrastinator.

We are all procrastinators

Even if you're not as messed up as I am (Laughter), you may have a healthy relationship with your deadlines, but be aware that the monkey's problem is most annoying when you don't have deadlines.

There's one last thing I want to show you.

"life calendar"

Each box represents a week in your 90-year life.

It's not like there's a lot of it, and we're already using it quite a bit.

I think we should all take a closer look at this calendar.

What am I really procrastinating?

You have to be aware of monkeys who want immediate rewards.

this is a job for all of us

Considering we don't have that many boxes, we should start this job today.

Well, even if it's not right now

(laughs) hopefully

in the not too distant future

thank you

(applause)

In ancient Greece, headaches were considered a affliction of great pain.

Headache sufferers prayed to Asclepius, the god of medicine, for help.

When the pain persisted, the doctor performed what everyone knew was a small hole in the skull to drain the supposedly infected blood.

This was a horrifying operation called a trepanation, which often left behind aftereffects that lasted longer than headaches.

Fortunately, modern doctors don't use power tools to treat headaches.

But there's still a lot we don't know about this ancient disease.

Headaches are now classified into two types: primary headaches and secondary headaches.

A primary headache is not a symptom of an underlying disease, injury or disease, but the headache itself.

I'll get back to primary headaches later, because although primary headaches account for 50 percent of all reported cases, secondary headaches are more often actually known.

Secondary headaches are caused by other health problems and can be triggered by dehydration, caffeine withdrawal, head and neck injuries, heart disease, and more.

Doctors have divided diagnosable headaches into more than 150 types, all of which have different causes, symptoms and treatments.

Here are some examples of common sinus infection headaches.

A sinus is a collection of cavities that extend deep into the forehead, nose, and above the cheeks.

When the sinuses become infected, the immune response produces fever to fight off the bacteria, but the cavities become inflamed and swollen.

Congested sinuses put pressure on the muscles of the head and neck, as well as the arteries and veins of the skull.

Pain receptors called nociceptors signal the brain to respond by releasing neuropeptides in large amounts, which inflames blood vessels in the skull and makes the head swollen and hot.

This discomfort, along with extremely sensitive head muscles, creates the throbbing pain of a headache.

Swelling doesn't always cause headaches

Tight muscles and inflamed, hypersensitive nerves can cause varying degrees of discomfort with each headache.

But every headache is a reaction to some stimulus to the skull.

While we know what causes secondary headaches, we still don't know what causes primary headaches.

There are three types of primary headaches, and scientists are still trying to figure out what triggers them: migraines, which are long, recurring episodes of pain; cluster headaches, which are short bursts of intense pain; and, most commonly, tension headaches.

As the name suggests, tension headaches are characterized by a feeling of a tight string around the head.

It causes tenderness in the muscles around the skull and pain with the pulsation of blood and oxygen.

Patients tell us that stress, dehydration and hormonal changes are triggers for their headaches, but these don't exactly match the headache symptoms.

For example, in a dehydration headache, the frontal lobe actually shrinks, creating a gap with the skull and puffing up the forehead, which is different from the location of pain in a tension headache.

Scientists have hypothesized the real cause, including spasms of blood vessels and hypersensitivity of nociceptors, but no one knows for sure.

On the other hand, most headache research focuses on the more distressing primary headache.

A migraine is a recurring headache in which the skull is clamped in a vise that lasts from four hours to three days.

20% of migraine headaches are so painful that they overstimulate sensory nerve endings because of abnormal action potentials in the brain.

This triggers hallucinations called auras, where you see flashes in front of your eyes, see geometric patterns, or experience a tingling sensation.

Cluster headache is another primary headache that causes a burning or stabbing pain behind one eye, red eyes, a small pupil, and drooping eyelids.

These headaches have a huge impact on the quality of life of many people, but how do we deal with them?

Tension headaches and most secondary headaches can be treated with over-the-counter pain relievers, such as anti-inflammatory drugs that reduce swelling in the skull.

And since many of the triggers for secondary headaches are dehydration, eye strain, and stress, they can be prevented.

Migraines and cluster headaches are much more complex, and we don't yet have a surefire cure that works for everyone.

But fortunately, there are pharmacologists and neurologists working hard to solve this mystery that plagues us.

Modern computers are so good that we don't even realize how bad they are.

I want to talk to you today about this problem and how we can "fix" it with neuroscience.

It was a frosty night in Harlem in 2011 that made a deep impression on me.

I was sitting in a bar outside Columbia University, where I was studying computer science and neuroscience, and I was having a meaningful conversation with a fellow student about the power of holograms, which could one day replace computers.

At the height of our conversation, yes, his phone lit up.

He pulled out his phone, turned to it, and started typing.

Then he looked up at me with just his eyes and said, "I'm still listening."

But, of course, his gaze became so dim that the time lost its meaning.

And then, across the bar, another student has a smartphone and holds it up to a group of friends.

I was swiping through my Instagram photos and they were all laughing.

I started thinking about how they were happy with the same technology that I was frustrated with.

The more I thought about it, the more I realized that the "bad guy" wasn't the digital information itself, it was simply the display device that separated me from my friends, but also brought them together.

They bonded around something, just like their ancestors, who developed social cognition by telling stories around a campfire.

I think that's what this tool is for

should be an extension of bodily functions

Computers today do the opposite.

When you're texting your wife, when you're composing a symphony, or when you're comforting a friend, you're doing exactly the same thing.

And I'm crouching down, navigating the endless stream of icons and menu buttons, squares like this one.

I think this is wrong. I think we can start using "natural machines" much more.

We should use machines that bring these tasks back into the real world.

By applying neuroscience principles, we should use machines that extend rather than restrict perception.

Now, I've brought such a machine here.

This is "Meta 2"

let's try

Now I can see you in front of me, and I can see my hands

So three, two, one, let's get into the immersive hologram experience. A very realistic hologram is emerging right in front of me -- right in front of the headset I'm wearing right now.

Of course, what you're looking at can be the product you're shopping for, or it can be a learning tool, and you can use your hands to finely control and manipulate it.

Iron Man would be proud

I will show you this soon

(Applause) If you're like me, you're excited to see what this technology can do, and the possibilities. So let's take a look at some.

My mother is an architect, so the natural thought that came to mind was to draw a blueprint for a building in three dimensions instead of a two-dimensional blueprint.

My mother is now touching the video to choose the interior decoration.

This was all shot with a GoPro camera through the headgear.

This next use case is a very personal one, courtesy of the University of California, San Francisco, the "Glass Brain" project by Professor Adam Ghathery.

As a neuroscience student, I've always dreamed of learning and learning as if by using a machine that could touch and manipulate this diverse and complex structure of the brain.

What you're looking at right now is augmented reality, but it's part of a much bigger initiative -- the idea of ​​augmenting physical capabilities with digital devices instead of limiting them.

here we go…

I believe that humanity will reach a turning point in the next few years.

All digital information begins to be represented in the real world.

Just imagine for a second what this means to storytellers, painters, brain surgeons, interior designers, and all of us here.

What we need to do as a community is to imagine how we can create new realities that augment the human experience, but not just gamify reality and digitally clutter it up.

I am very passionate about this

Well, let me tell you a little secret.

In about five years, this isn't a tiny device, but in about five years, they're all going to look like thin glasses projecting holograms.

When we choose a smartphone, we care less about the hardware itself and more about the operating system, but as a neuroscientist, I've always dreamed of building, so to speak, the iOS of the mind.

Getting this right is very important, because we may be spending at least as long with a system like this as a Windows screen interface (GUI).

I don't know about you, but living in Windows is scary.

(Laughter) In order to come up with the most intuitive interface out of all the possibilities, we've turned neuroscience into the cornerstone of our design, instead of having designers battling it out in the boardroom.

And this central principle is called "the neural pathway of least resistance."

The iOS of the mind is constantly connected to the human brain, and for the first time the human brain controls the iOS.

In other words, we're trying to build a computer that you don't have to learn to use.

We are creating systems that users naturally understand how to use.

I'd like to introduce you to three major new user experience design principles that we use.

The most important thing is that "the user is the OS"

A traditional system of files is complex and abstract, and even understanding it takes a lot of brain power.

It's doing the opposite of "the neural pathway of least resistance."

But in augmented reality, if you put a holographic TED panel here and a holographic email on the other side of the desk, your spatial memory adapts to this, and you can reach out and retrieve the information.

I can hologram anything from the Tesla car I'm looking to buy, to whatever the legal team has asked me to do before I go on stage.

(Laughter) Okay, now your brain knows how to extract information.

The second guiding principle of interfaces is "see and touch."

What's the first thing your baby does when he sees something that interests him?

I will try to reach out and touch you

This is how a "natural machine" should work.

The visual system receives its basic stimuli from what we call proprioceptive sensations, or deep sensations, which are sensations that occur deep within the body.

So by having direct contact with the work, you not only have better control over it, but you also have a deeper understanding of it.

That's why we "see and touch"

But this alone is not enough of an experience.

Humans are primates, social creatures by nature.

And that leads to the third pointer, which is the holographic version of the bonfire example at the beginning.

The primate mirror neuron subsystem shows that if we can see each other's faces and hands in three dimensions, we can work better together and work together.

Check out the video behind me, two Meta users working with the same hologram, making eye contact and connecting through this object without being distracted by the device.

Now, with neuroscience in mind, let's try this again.

Our favorite is "iOS of the Heart"

Let's take it one step further, pick up this headset and put it right here by your desk.

Now I'm with you, this moment we're connected

My spatial memory kicks in, and when I grab the headset and take it back, I realize I'm the OS.

And my proprioceptive senses kick in, and I break this headset down into its thousands of parts and touch the sensors that scan my hand.

But seeing this for myself isn't enough, so now my co-founder Ray is going to call me in 3D soon -- Ray?

(Rings) Hi Ray How are you?

Ladies and gentlemen, I can see him in front of me in three dimensions.

with photorealism

(Applause) Thank you.

My mirror neuron system suggests that this will soon replace cell phones.

How are you doing Ray?

(Ray) Okay, we're having a live conversation right now.

(Applause) (Melon) Ray, show us the holographic brain that you saw in the video earlier.

Ladies and gentlemen, this isn't just going to change the phone, it's going to change the way we work together.

thank you

thank you ray

(Ray) You're welcome

(Applause) (Melons) That's the message I found at that bar in 2011. The future of computers isn't confined to flat screens.

here in us

(Applause) If I had to pick one idea for you today, it would be that the "natural machine" isn't some future fabrication, it's here in 2016.

So by TED2017, all 100 people at Meta -- the administrative staff, the executive team, the designers, the engineers -- will have thrown out their screens and are truly "natural machines."

thank you

(Thank you for applause

thank you

(Chris Anderson) So I'd like to ask -- over the last few years there have been several demonstrations of augmented reality.

There is sometimes a debate among engineers about whether we are actually seeing things on a big screen.

And there was also the point about the field of view, that the demo would give you a wider field of view than what you would see if you were wearing the actual headset.

Is that the actual video you showed me?

(Melon) Of course it's real

Not only that, but when I made this video, I took special care to shoot it through the lens of a GoPro camera.

Because I wanted everyone to have a simulated experience of the real experience that you see through the headgear.

(Chris) Thanks for the introduction.

(Melon) Thank you very much.

The first thing I want to tell you is that we all love music, and this is very important.

Music becomes more powerful when you can create your own music instead of just listening to it.

This is the first theme By the way, do you know the "Mozart effect"? For the past 10 years or so, we've heard a lot of stories about how just playing music to a baby in the womb, or playing music to a baby in the womb, can improve their IQ by 10 to 30 points.

It's a great idea, but it doesn't work.

Just listening to music is not enough

You have to create music in some way. And I would like to add that this is not just about creating music, but that we all have the capacity to create music in very dynamic ways, to be part of the music itself.

What we've been working on for a long time at the MIT Media Lab is

It's a project called active music. The theme is that not just listening to music

Is there a way to make it possible to create music? We started by building special instruments for the best musicians. And what we call hyperinstruments, they're for Yo-Yo-Ma, Peter Gabriel, Prince, orchestras and rock bands. They have all sorts of sensors built into them that allow them to understand how they're playing.

You can change the way you interpret and perceive the performance data that you know, and you can transform the timbre of a cello into a human voice, into a performance of a large orchestra, or into music that no one has ever heard.

When we started developing these instruments, we wanted to bring these wonderful instruments to the general public, to the general public who weren't talented musicians like Yo-Yo Ma and Prince.

So we started thinking about making one, and as a result, we developed a series of musical instruments.

One of the culminations of these is "Brain Opera."

It's like an orchestra of 100 different instruments, all without any special training.

It's designed for anyone to play, which means you can drive through the music like you're playing a video game, you can use your gestures to control a large amount of sound, you can touch a specially textured surface to create a melody, or you can add a unique atmosphere to the music with your own voice.

At Brain Opera's performances, we decided to invite the general public to play with this instrument, to play with us, and to create each performance together.

The Blaine Opera toured for a long time, and is now permanently in Vienna, where it's in a museum.

This led to something that you all know very well.

Guitar Hero was born out of our research, and if you look at my two teenage daughters and the many students at the MIT Media Lab, you can see that if you create the right interface, anyone can be interested in putting themselves in music and playing it over and over again.

Now I know the basic model works, but this is just the tip of the iceberg, because my second idea is that it's not enough to just want to make music in a game like Guitar Hero.

Because music is so much fun, but it's also something that's much more transformative.

this is very important

Music has the power to change lives more than anything else.

Music can change the way people communicate with each other. Music can change your body, it can change your mind.So we started a project to take Guitar Hero to the next level.

We have a lot to do with education. In our long-running project, Toy Symphony, we developed a range of instruments that little kids, aside from very young children, would be engrossed in. Without realizing it, they were drawn to making music. It measures the current flowing through your fingers to make music.It measures the current flowing through your fingers to create music.An instrument we call "Beatbug" automatically picks up the rhythm when you tap it, and passes it from person to person, like a baton. And it's so easy to use that once you use it, you can get into any style of music.

It's had a huge impact on children all over the world, and people of all ages use "Hyper Score."

I've become more and more interested in taking this kind of creative activity out into the wider realm and into all kinds of people, people who wouldn't normally have the chance to make music.

One of the areas we're working on and expanding at the MIT Media Lab is

Music, mind and health. I'm sure many of you are familiar with Oliver Sacks' wonderful new book, "Musicophilia." It's a wonderful book.

The author is a pianist himself, and in this book he describes from his own experience how music can have a profound effect on people in extraordinary circumstances.

For example, Alzheimer's disease patients are known to respond to music throughout their disease progression.

This kind of experience in your family Isn't there someone who has it? For example, a patient who looks at himself in the mirror and doesn't recognize anyone or even his family can respond to music.

Music is one of the best ways to restore language skills in people who have a speech impediment due to a stroke, or as a way to restore motor skills in people with Parkinson's disease.

Music can be very helpful in improving many medical conditions, such as depression and schizophrenia.

So what we're trying to do is try to understand the underlying principles of why this is so, and we're trying to develop activities that use music to improve people's health.

We are working on this from various approaches

For example, we're working with several hospitals, one of which is Tewkesbury Hospital near Boston.

This is a long-term care state hospital, and a few years ago, we started working with hyper-scores for the physically and mentally challenged patients at this hospital.

It's become the center of care at Tewkesbury Hospital, and everyone is itching to do music.

I think that this is the activity that will most improve the care of patients, and that brings a sense of community that is connected through musical activities throughout the hospital.

Let's take a look at a short video summarizing our projects so far.

This is the children manipulating the rhythm.

Not only can you learn to play and listen to rhythms, but you can also learn musical memory and how to play along with others.

You can compose your own songs, change them, and make them your own songs.

So with Hyperscore, you can start from zero in a very short period of time.

Everyone can experience music on a very deep level, and to do that, we need to create tools that have never existed before.

The third theme I want to talk about today, a bit paradoxical, is that music is a better way to talk about yourself than words.

If I play the cello, or the synthesizer, or if I'm going to show you my songs, I'll be able to tell you something much more personal and deeper than words can say.

And I think a lot of people do too. So let me give you two examples of how music is the most powerful tool that connects us to the rest of us.

The first example is an unusual project we're working on right now, a big opera called Death and the Powers, which is probably one of the biggest operas in production today.

It's the story of a very successful, powerful, and wealthy man who wants immortality.

A man tries to download all the data about himself into a series of books.

With this, a man will try to obtain eternal life.

When the lead singer disappears from the stage at the beginning of the opera, the entire stage becomes the hero's personality.

This opera is about what you can share with others and with your loved ones, what you can say and what you can't say.

In an opera, everything becomes a giant, living instrument. What looks like a giant chandelier that covers the entire stage is actually a robotic instrument.

The strings of this gigantic piano are controlled by tiny robots. Tiny bows pluck the strings, propellers beat the strings, sounds make the strings vibrate, and there are also many robots on stage.

These robots act as mediators between Simon Powers, the main character, and his family, and they're like the choirs of an ancient Greek play.

Watching a performance on stage, this square robot currently being tested at MIT is called Operabot.

Operabots work in time to music, they follow characters, and they're intelligent enough that they shouldn't clash with each other.

The robots move automatically, and of course, you can snap your fingers into alignment if you like.

It's just a cube, but you could say it actually has a personality.

The biggest stage set in an opera is a bunch of books called "systems."

The whole book is a robot, and it can move and make sounds, and when it's all put together, it's a wall like this, and it shows Simon Powers' gestures and his personality.

Because it was the main character's intention to transform himself in this way.

The spine of the book has a large number of LEDs that can project images.

This is where the famous baritone James Madalena enters the system.

watch the trailer

This opera is scheduled to premiere in Monaco in September 2009. In case you can't come to Monaco, let me show you another application of this project.

It's about a man trying to leave a legacy, making this work available online and in public spaces, using music and images of ourselves to leave a legacy for ourselves and those we love.

So instead of a big opera, it's going to be a personal opera.

When developing a personal opera

What should I do with my instrument? Whether you're looking at a hyper cello for Yo-Yo Ma or a hand-held instrument for kids, they're all for a certain level, whether you're a big player or a kid.

What if I developed a musical instrument that could be played with just normal gestures? Gestures and gestures may be very good

Maybe not, this is the future of interfaces, the future of music.

And I think it's going to be the instrument of the future. I'd like to invite two very special guests here to give you an idea of ​​what a personal instrument is all about.

Please give a round of applause to MIT PhD students Adam Branget and Dan Elsie. Dan, thanks to TED and Bombardier FlexJet, got here from Tewkesbury Hospital today. He's an inpatient at Tewkesbury Hospital.

I think it's the furthest I've ever traveled from the hospital, and that's because he really wanted to play his music in front of you.

Dan: First of all, I would like to say a few words to everyone.

Hello, my name is Dan Elsie, I'm 34 years old and I have cerebral palsy.

I've always loved music, and I'm really excited to be able to play my own songs with this new software.

We are all so excited to have you here today. We met Dan about three and a half years ago when we started our studies at Tewkesbury Hospital. Everyone we met there was amazing and musically gifted. Dan had never written music before.

You are very shy

I found him to be a great composer, and he worked with us over the next few years, and he wrote a lot of songs.

He's got a CD out, and he's pretty famous in the Boston area. He teaches composition to hospital patients and local kids.

Now let me introduce you to Adam, an MIT PhD student who specializes in music, technology and medicine, and who has worked with Dan.

Recently, Adam's research isn't just about what Dunn should do to compose his own music, but he's also been researching how Dunn himself uses personal instruments to play it.

Can you briefly explain what kind of research you are doing?

Well, Todd and I were doing research at Tewkesbury Hospital, and Dan was very expressive, intelligent, and creative. Dan shows it with his facial expressions, his breathing, his eyes. I thought it was our job to make it possible.

We decided to develop a technique that would allow Dan, with his physical disabilities, to express his nuances and play his own songs with precision.

First, we need the process and the technology. Basically, we needed an engineering solution. You see, a camera attached to a computer detects infrared positioning signals.

We used gestures, facial expressions, and other methods that Dunn was already familiar with in his speech aids to express his music.

The design was the least interesting part, what was the input signal and what was the persistent tracking, the software knew the pattern of Dan's behavior.

But the really interesting work comes after the technical issues.

What movements help him to express his music?

In other words, what is musical expression for him? about it

What is important to Dan in expressing and communicating musical nuances?

We pushed variables and techniques to the limit to make sure Dunn was able to express the music perfectly.

This is a mindset shift, which means that this technology does not enable anyone to make creative music.

What exactly is an expression? What is the expression of the moment when a musician plays a great piece? Does technology make it possible to express yourself?

Is it possible to create a mechanism that enables such a thing with technology? So, for Dan, we needed new design methods and new technology, and we needed to find a mechanism to link Dan's movement and expression to performance.

I will show it to you today

Dan, can you explain the song you're going to play today?

It's called "My Eagle Song"

Dan will be performing "My Eagle Song," which he composed.

This is the sheet music for Dunn's song, composed entirely by myself using Hyperscore.

He can use hyperscore directly with an infrared tracking device.

You can use it really quickly, even faster than me.

(Laughter) He's humble.

Using Hyper Score, first create a melody and rhythm

You can move it wherever you like

Each one is colored, and when you go back to the composition window, you can draw lines and arrange all the elements as you see fit. If you look at the Hyperscore, you can see this: where each section is.

And that's how he composed it, and as Adam explained, we also developed the best mechanism for Dan to be able to play it himself.

This camera observes and analyzes his movements and is able to bring out the different characteristics of his songs as Dan wishes.

You will notice the image on the screen

I decided to have my students show me how the camera was measuring their movements.

So instead of just showing you what the camera is doing, I've processed the image and turned it into a graphic representation to make it easier to understand how it analyzes motion.

I hope this gives you an idea of ​​how I pick up on Dan's movements, and not only that, but when you look at the movements that Dan plays, you can see that his movements are very clear, precise, well-coordinated, and also very beautiful.

If you listen to this song, you'll understand what I said at the beginning, that the music is great, and what kind of person Dan is.

Adam are you ready?

yes

OK, so Dan's going to play "My Eagle Song" for you (music).

(Applause) Bravo!

(applause)

In 1962 at Rice University, John F. Kennedy told the nation his dream: to send a man to the moon sometime in the '60s.

Origin of the word "moonshot"

I didn't even know if it was possible, but if it was possible, I planned for it to happen.

That's what a great dream is

A great dream has not only a vision, but also a strategy to make it come true.

I am very lucky to work at the "Moonshot Factory".

At X -- formerly known as Google X -- there's an aerospace engineer working with a fashion designer, and a former military operations commander brainstorming with a laser expert.

These inventors, engineers, makers are coming up with technologies that will make the world a better place.

We use the term "moonshot" to remind us to dream big.

And the reason I use the word "factory" is to have a concrete vision, a concrete plan to realize it.

Here's the concept of the moonshot

First, I want to find the big problems in the world that affect millions of people.

Second, I would like to discover or propose an epoch-making method to solve the problem.

And third, there must be reason to believe that the technology for such breakthrough solutions can be created.

let us know your secrets

The Moonshot Factory is a chaotic place.

But instead of avoiding chaos or pretending it doesn't exist, they're trying to use it to their advantage.

We spend a lot of time trying to break something or prove ourselves wrong.

that's the trick

I hit the hardest part of the problem first

He cheers and encourages, "Hey, how are we going to kill the project today?"

There's a fine balance here, with unbridled optimism as the driving force behind the vision.

Through passionate skepticism, we breathe life and reality into our visions.

I'm going to show you some examples of projects that have fallen on the editing room floor, and some that have not only survived this process, but have been accelerated by it.

Last year, we closed the automated vertical farming project.

The picture is lettuce that I was cultivating.

1 in 9 people in the world are undernourished

So this was the moonshot that had to happen.

Requires 1/10th the water and 1/100th the land of traditional agriculture

No need to transport long distances as it is grown near the consumption area.

Progress has been made in many areas, from automated harvesting to more efficient lighting.

But unfortunately, staple crops like rice and wheat could not be grown this way.

So this project was discontinued

Another example of a big problem

Global transportation of goods is costly in terms of resources and environmental impact.

And the economic development of landlocked countries is limited by the lack of shipping infrastructure.

What would be the breakthrough solution?

It's a variable buoyancy cargo ship that's lighter than air.

total cost and time of transportation, potentially lower carbon footprint, no runway required.

There was a series of clever technological innovations that could have made these ships cheap enough to bring the cost down enough, if they were made in large numbers.

But it turns out that even though it could be mass-produced and cheaply made, it would still cost close to $200 million to design and build the first one.

$200 million is way too much

Because at the heart of X is a tight feedback loop of learning from mistakes and creating new designs, and we can't afford to spend $200 million to get the first data point to decide if we're going in the right direction.

If there's an Achilles heel in a project, I want to know right up front, not afterward.

So I canceled this project as well.

Finding a big problem doesn't necessarily mean the death of the project.

It can lead you down a more fruitful path.

This is a prototype fully self-driving car, no steering wheel, no brake pedal.

But this wasn't the shape we were aiming for when we started.

Road accidents kill 1.2 million people worldwide every year, so building self-driving cars was a natural moonshot.

Three and a half years ago, we were testing this self-driving Lexus car, and it was doing really well, so we decided to let other Googlers try it out and hear what they thought.

And what we found was that the original plan to have the car drive itself most of the time and only give up control to a human in the event of an emergency was really bad.

It wasn't safe because the people on board didn't do it properly.

The occupants were lethargic and couldn't handle the sudden reversal of control to the car.

It was a crisis for the development team.

I decided to rethink from 1

And they've come up with a brilliant new way of doing it.

We're aiming for a car in which the person is wholly the passenger.

You tell the car where you want to go, you press a button, and the car takes you from point A to point B.

I am very grateful to have had this insight so early in the project.

It's influenced everything we've done since then.

Our cars have covered 2.3 million miles of self-driving so far, driving the streets of Mountain View, California, and Austin, Texas, every day.

The self-driving car team has changed its mind

This is also the basic principle of X.

Changing perspective is sometimes more powerful than academic ability.

think about wind power

It's my favorite example of a shift in perspective.

If it's a standard wind turbine, there's no way we can make it better than the experts in the field.

But we've found a way to put it higher in the sky, so we can catch faster, more consistent winds and generate more energy without having to haul hundreds of tons of steel.

The Makani Energy Kite spins propellers on its wings and soars high from its perch.

As it rises, it lets out the string and receives energy from it.

When the kite string is completely stretched, it circles in the sky while receiving crosswinds.

The propellers you used to take you to the sky are now turning into flying turbines.

And then send the energy down to earth through the kite string.

We haven't yet found a reason to kill this project.

The longer we survive this strain, the more hopeful it will become a cheaper and more deployable way to harness wind energy around the world.

Project Rune is probably the craziest thing we do.

We're going to use balloons to provide internet.

A network of balloons in the stratosphere will connect the remotest parts of the world to the Internet.

It could bring the four billion people who have no or little internet access today online.

But we can't just tie a cell tower to a balloon and leave it in the sky.

The wind is so strong that it blows me away

The balloon is too high to even connect to the ground.

Outrageous ideas come out there

Instead of trying to fix it, why don't you let it drift and tell you how to ride the wind where you want to go?

In the stratosphere, we found that each thin layer of the stratosphere has very different wind directions and strengths.

So I thought, with clever algorithms and wind data from all over the world, we might be able to steer the balloon by raising and lowering it slightly in the stratosphere to catch winds of different directions and strengths.

And have enough balloons so that if one balloon leaves your area, another balloon can come in and take over your Internet connection, much like your cell phone connection is handed off from base station to base station when you're driving.

I knew how crazy this idea was, and that's why the name of the project, which also means "madman."

Since 2012, the Loon Team has prioritized the most difficult and most likely project-ending problems.

The first thing we did was connect a Wi-Fi connection from a balloon in the stratosphere to an antenna on the ground.

It went well

It was well thought that this might not work.

So it was continued

Is it possible to connect the balloon directly to the mobile device and eliminate the need for a relay antenna?

I was able

So much so that you can not only have SMS, but a real Internet connection.

Can we increase the bandwidth of balloons?

In the initial experiments, it didn't even reach 1 Mbps, but now it goes up to 15 Mbps.

You can even watch TED talks

Can balloons communicate with each other in the sky and deliver signals to remote areas?

no problem

Can a balloon be the size of a house so that it can stay in the air for 100 days or more, but still cost less than 5% of the cost of manufacturing a traditional, durable balloon?

finally got it

But I tried everything to get there.

I made a round silver balloon

I made a giant pillow balloon

I made a balloon the size of a blue whale.

burst a lot of balloons

(Laughter) One of the most likely reasons for the end of the Rune Project was whether or not you could get the balloon to move the way you wanted it to, and the most important experiment was putting a balloon inside a balloon.

There are two chambers, one with air and one with helium.

Inject air to make it heavier, remove air to make it lighter

This change in weight causes it to descend or ascend, and this simple movement steers the balloon.

By ascending and descending, it tries to catch the wind in the desired speed and direction.

But is that enough to get you around the world?

It was difficult at first, but it got better.

A state-of-the-art balloon can navigate to a destination 20,000 kilometers away with an accuracy of 500 meters by controlling its altitude over a range of 3 kilometers.

We still have a lot of work to do to fine-tune the system and reduce costs.

But last year, using a cheaply manufactured balloon, I was able to circle the globe 19 times in 187 days.

so this will continue

(Applause) Today's balloons do most of what a complete system should do.

We're talking to telephone companies around the world, and we're planning to do real service trials in places like Indonesia this year.

It may sound too good to be true, but it is.

The idea of ​​being ambitious about something big and risky is what makes people uneasy in the first place.

I can't yell at you and force you to fail fast.

will resist they will worry

"What if I fail?"

"Aren't you going to laugh at me?"

"Are you going to get fired?"

We started the story with our secret

Let's finish by telling you how we do it.

The only way to get people to take on big, risky things, big ideas, and dive first into the hardest part of the problem is to make that path the easiest to choose.

At X, we strive to make it safe to fail.

As soon as the team finds evidence to the contrary, they quickly drop the idea, because that's how they're measured.

be applauded by colleagues

I get hugs and high fives from my boss, especially from me

get promoted by it

Each member of the team that completes the project receives a bonus, from teams of 2 to teams of 30+.

At Moonshot Factory, we all believe in dreams.

But enthusiastic skepticism is not the enemy of boundless optimism.

Rather the best buddy

It unlocks possibilities in ideas.

we can create the future we dream of

thank you

(applause)

Your Favorite Athlete Just Before Victory

At that moment when the audience holds their breath, an unexpected miss shot

At this point, the athletes were caught in a phenomenon known as "agari," where, despite months and years of practice, people fail at the most important points.

Winning is common in sports, because you're often playing under a lot of pressure, and the odds are decided in a fraction of a second.

Accomplishment anxiety hits public speakers as well as contestants in spelling competitions and world-famous musicians.

Most people intuitively blame it on tension, but why does tension impair skilled performance?

There are two theories about it, and both are about concentration.

The first is the idea that it's distracting.

The idea is that if your mind is filled with anxiety, suspicion, and fear, and you can't focus on what's in front of you, then you're not doing your best.

Even if both relevant and irrelevant things come to mind at the same time, only some of them come to mind.

the brain can't process too much information at once

Our working memory, our mental notepad, helps us temporarily remember phone numbers and shopping lists, but tasks that use working memory are particularly vulnerable to pressure.

In a 2004 study, college students were instructed to solve math problems, some easy, some more complex, requiring memory.

Half of the students did it without pressure, and the rest did it in a calm environment and under pressure.

All of them did well on the easy problems, but the students who worked under stress did worse on the difficult, memory-requiring problems.

The second theory about "agari" is due to conscious monitoring.

This theory argues that under pressure we may overanalyze the task at hand.

In other words, the skills you learn to do without even realizing it are thwarted by your attention to detail.

Involuntary movements are most susceptible to "getting up"

There's a study of the performance of elite golfers when they're simply told to focus on putting the putt correctly versus when they're told to pay attention to the motion of the putt.

Golfers usually do these movements unconsciously, so players who suddenly began to pay attention to small movements were not able to land accurate shots.

"Getting up" doesn't happen to everyone

Research shows that people who are more likely to get votes are more likely to be people who are self-conscious, anxious, and afraid of being criticized by others.

How can we avoid failure in critical situations?

The first is to practice under stress.

A study of experienced darts players found that those who practiced in stress-free conditions performed worse when anxious than those who were able to tolerate stress.

Second, many athletes rave about the benefits of doing pre-match routines.

Studies in golf, bowling, and water polo showed that performing short routines resulted in more consistent and accurate performance under pressure.

And third, I've found that looking externally at the end goal works better than focusing inwards on the details.

A study of experienced golfers showed that they played significantly better when they focused on the direction of the ball when chipping than when they focused on the movement of their arms.

We may be able to change the old adage, "If you practice under pressure, stay focused, and aim for glorious goals, you'll succeed."

Thousands of years into the future, the century of computers will be looked back on as both fascinating and strange. It was the only time in history when humans lived confined to two-dimensional space and interacted with technology as if they were machines.

Today, we spend a lot of time looking at and tapping screens.

What happened to human relationships?

I don't know about you, but I feel cramped in this two-dimensional world of screens and pixels.

It's precisely this limitation, and the desire to connect with others, that inspires me as a creator.

In short, I want to create a new reality where technology brings us closer together, where humans, not machines, are at the center of everything.

I dream of a world where technology knows what we see, touch and feel, a world where technology doesn't get in the way of us and accepts us as we are

Dreaming of technology above the human road

We're seeing technologies and products that allow humans to behave like humans and interact in a natural way, like voice control and biometrics.

Here is the next stage of evolution

Microsoft HoloLens is the first fully self-contained holographic computer.

It allows 3D holograms to appear in our world to augment our everyday experience beyond our normal perception.

I'm not talking about the distant future.

talking about the present

Car companies like Volvo are already using HoloLens to design cars differently. Universities like Case Western are changing the way medical students learn with HoloLens.

The important point here is

Bringing holograms into the world isn't just about new devices and better computers.

It means breaking free from the two-dimensional cage of traditional computers.

Think of it this way: Shifting the time axis, we are like cavemen to computers.

I've just discovered charcoal, and have just started painting my first stick figures on cave walls.

This is the perspective that I take in my work every day.

In the next few minutes, I hope you'll see this demo in the same light.

While I'm wearing the HoloLens, let me explain the configuration.

This is the riskiest HoloLens demo we've ever done, and there's no better place to do it than at TED.

Soon I will see a hologram on this stage that is as clear as you are.

And at the same time, I'm going to invite you to join us in experiencing it through the special camera footage that just entered the stage.

let's get started

What better place to start our journey than a computer's two-dimensional cavern?

Explore the world around you through this new lens and see the world of computers in a new light.

The computer universe is both wonderful and primitive.

It's a causal universe

As developers, we think of causes and program different outcomes.

Double-clicking the icon causes

It is the result that the application opens

This is too restrictive compared to the physical universe we live in. Our universe is not digital.

because it's analog

The universe doesn't think 0 or 1, true or false, black or white.

We live in a world dominated by quantum mechanics, a universe that is both zero and one, a reality based on infinite possibilities and continuous tones.

No wonder these two worlds collide.

So why is our analog life filled with so many screens?

From the moment I wake up to the moment I fall asleep

Why?

Because computers give us tremendous power.

In the digital universe, we can jump through space, and we can jump through time.

It doesn't matter if you use technology for entertainment, for work, for communication.

Think about it when you get home tonight and watch your favorite TV show.

This is a theater, transcending time and space.

As soon as this TED talk is over, I'm going to call my dear family in Seattle --

space is jumped there

It's so powerful that it puts up with the two-dimensional limitations of today's digital world.

But what if you didn't have to hold back?

What if we could use the same digital powers while staying in this world?

You may have already seen the signs of that, but I believe that our children's children will grow up in a world without 2D technology.

It's wonderful to dream of such a world, a world where technology truly understands us, a world where we live and work and communicate not with machines that limit our humanness, but with tools that enhance our human experience.

How can we do that?

To answer that, I had to look at the problem from a different perspective.

I had to perceive the world from a machine's point of view.

If you were a computer trying to perceive the world, how would you partition the problem?

I would probably categorize "things" into people, environments, and objects.

But how does that computer interact with the world?

I think there are 3 ways

First, it observes or inputs reality as a machine.

Speech recognition and biometrics are good examples of how machines interact with humans in terms of input.

Second, as a machine, it places or outputs digital information in the real world.

Holograms are a good example of how a machine interacts with the environment in terms of output.

Finally, as a machine, it exchanges energy with the world through contact.

Imagine feeling the temperature of a virtual object, or pushing a hologram and it pushing back with the same force.

This perspective allows us to turn reality into a simple matrix.

And let me tell you, as an engineer, I get super excited when I can put something into a queue.

From self-driving cars and smart homes to this holographic computer on my head, machines are beginning to understand our world.

They're getting to treat us in a much more personal way.

What if you had fine control over everything in the world?

If you turn the dial in one direction, you can see the real world.

Turn the dial the other way, and you'll see virtual reality.

What if you could switch an entire environment between reality and virtual reality with a dial?

i like being in this place

What if I could change the way I see you from a human to an elf with a dial?

When technology truly understands our world, it will change the way we interact, work and play.

About half a century ago, two brave men landed on the moon with computers that were weaker than the phones in your pockets.

600 million people watched it on blurry black-and-white TV.

and the whole world

fascinated

Think about what the experience of exploring space might look like for our children's children, with technology that understands the real world.

We already live in a world where real-time universal translators exist.

We can also predict that telepresence using holograms will appear in the near future.

Luckily, the demo is working so far, so let's try something bigger.

What you'll see is the world's first teleportation of a life-size hologram between myself and my friend at NASA JPL, Dr. Jeffrey Norris, on the TED stage.

Wishing you all the best Can you hear me, Jeff?

(Jeff) Oh Alex

(Alex) Wow it worked! How are you doing Jeff?

(Applause) (Jeff) Okay, this week was especially good.

(Alex) Can you explain where you are?

(Jeff) I'm in three places at the same time.

I'm standing in a room across the street, and I'm on stage with Alex at the same time, and I'm standing on Mars, over two million kilometers away.

(Alex) Two million kilometers away! amazing!

Can you tell me where that Mars data is coming from?

(Jeff) Okay

This is an exact holographic replica of Mars, made from data collected by the Mars rover Curiosity, so it's as easy to explore as it is on Earth.

Humans are natural explorers

You can immediately grasp the environment just by being there

Humans have built tools like Mars rovers to extend our sight and reach.

For decades, I've been sitting in front of a screen and a keyboard exploring.

Now I'm jumping over everything, big antennas, relay satellites, big distances between two worlds, as if I'm actually there, and I'm taking my first steps into this landscape.

The scientists working on our mission are seeing Mars like never before, and now that we can finally explore it in a human way, this alien world feels a little more familiar.

But our dreams don't end there

By switching the dial from the real world to the virtual world, you can do magical things.

Seeing with invisible wavelengths or teleporting to the top of a mountain

Someday I'm sure you'll be able to feel the minerals in rocks just by touching them.

we are taking the first step

I want the whole world to join us in the next step, because it's not for the few, it's for all.

(Alex) That's great, Jeff.

Thank you for joining us on the TED stage today.

(Applause) (Jeff) Thank you, see you soon, Alex.

(Alex) See you soon Jeff

(Applause) This is the kind of future I dream about every day.

I draw inspiration from my ancestors

Humans once lived, interacted, communicated and worked together in tribes.

We're starting to build technologies that will allow us to return to the human things that have brought us to where we are today. Technologies that will allow us to stop living in a two-dimensional world of monitors and pixels. Technologies that will remind us what it was like to live in this three-dimensional world.

There's never been a better time to be human

thank you

(Applause) (Helen Walters) Thank you very much. I have a few questions.

(Alex) Go ahead

(Helen) It's something that's been discussed in the media.

I'm going to ask you straight, so please answer straight.

A lot has been said about the difference between demos and real products.

it's a matter of vision

Is this something that the person who buys the product can actually experience?

CA: That's a good question. It's a question we've been getting a lot from the media over the past year.

If you look it up, you'll find that I didn't answer that.

I was ignoring it on purpose, because it wasn't what I was supposed to hear.

It's like when I show someone a hologram for the first time, I ask them, "What size is that TV?"

Visual angle has little meaning for this product

We should be asking about the density or radiance of the displayed light.

A better question would be, what is the angular resolution?

As for what you saw, I have a HoloLens on that camera.

Even if you want to deceive, there is no way to deceive

HELEN: But a camera lens is different from a human eye, right?

(Alex) That camera has a fisheye lens.

It has a wider field of view than the human eye.

When you think about the radial points of light coming out of the camera's point of view, what matters is how many points of light there are per volume.

It's the same on this HoloLens and that HoloLens.

This camera sees a much wider area

(Helen) Whoa!

(Laughter) (Alex) Did I mention he's coming out? please calm down

(smile)

(Helen) damn

Alex: Hologram Jeff Norris.

HELEN: I knew something was going on, but I didn't know what it was.

Alex: In short, very clearly, that camera has a wider field of view than the human eye.

The angular resolution of the hologram we see, the number of points of light per unit area, is the same.

(Helen) Jeff, you've got something to talk about later, so you've spent a long time mapping this stage, haven't you? (Alex) Yeah.

HELEN: Let me tell you, when I buy a HoloLens, I don't have to map my apartment, right?

Alex: HoloLens is doing real-time mapping at five frames per second, which is called spatial mapping.

So as soon as you put your HoloLens on in your home, holograms start appearing and you can place them and learn what's going on in your home.

In this stage setting, I'm trying to send from the one in my head to the other over the whole wireless connection, but I didn't want to take the risk of doing it live, because that usually means dropping all the lines.

So I used the same spatial mapping technique that I use at home, and I mapped the stage at five frames per second and saved it beforehand, so that if the wireless connection in this kind of environment messed up the communication between the camera's HoloLens and my HoloLens, the footage wouldn't disappear.

The hologram is coming out of this HoloLens, and that HoloLens is just watching.

When you lose your connection, you can't see the nice things on your screen.

(Helen) That was so beautiful

By the way Jeff

(Jeff) What?

(Helen) Hi

(Alex) I'm down

HELEN: So you're on Mars, you're here, you're in the room across the street.

Tell me, you can see holograms, but you can't touch them or smell them.

Is it still useful for science today?

That's my question for Mr. Hologram.

(Jeff) Thank you for your question.

I definitely think that at this point in time, this technology is useful for science, and that's why it's being used in various divisions at NASA.

I'm using it to improve the way we explore Mars.

For space station astronauts

We're using it to design the next generation of space probes.

(HELEN) That's great Jeff, can you please go away? Thank you very much

(Laughter) Alex, that was amazing, thank you very much.

(Alex) Nice to meet you

(Helen) Thank you so much.

(applause)

It started with one question: "If Africa were a bar, what would your country drink and do?"

When I replied that in South Africa it would have been something like this, I was just a little outside the rules, because South Africa is not "my country."

But referring to South Africa's tireless efforts to build a racist society after decades of apartheid devastation, he tweeted: #if africa was a bar, south africa would drink all kinds of alcohol and hope that everyone was doing well in their stomachs.

then i waited

I thought, "Maybe I overdid it?"

I sent a few more tweets about my country and the countries I know.

So I waited again, but this time I skimmed through all of my tweets, just to make sense -- no, to disapprove -- that it was really funny, and that's okay if no one knew.

But luckily I didn't have to wait that long.

Soon everyone was tweeting

In fact, by the end of that week in July, about 60,000 tweets collected by the hashtag #IfAfricaWasABar had lit up the continent and gone viral around the world.

This hashtag has been used in many ways.

Making jokes about stereotypes [#ifAfrica is a bar Nigerian says they'll pay entry but won't come in because they're just looking for account information] (Laughter) Criticizing government spending [#ifAfrica is a bar South Africa can't pay to order a bottle they can't pronounce] Focusing on geopolitical tensions [#ifAfrica is a bar South Sudan is crazy newcomer] Africa Remember that there is a forgotten country in . ] Countries that forgot they were African nations [#If Africa was a bar Egypt Libya, Tunisia, Algeria, Morocco were like, "What the hell are we doing here?!!

Connected beyond my Africa

For a week in July, Twitter became a veritable African bar.

I was really excited because I realized that Pan-Africanism might be like this, because we already have a platform in front of us, between us, at our fingertips, and all it takes is a tiny spark to ignite our longing for each other.

My name is Sianda Moftisiva, I'm 22 years old, and I'm a born Pan-Africanist.

Now, I say that because my parents are from two different countries in Africa.

My father is in Botswana, just a little bit bigger than Germany.

I come from a country in southern Africa

This year we are celebrating the 50th anniversary of democracy.

have very progressive policies

Mother is the Kingdom of Swaziland

I'm from a very small country in the same southern part of Africa.

It's Africa's last full monarchy.

It has been traditionally ruled by kings and royal families for a very long time.

If you look only at the system, the two countries are very different.

As a child, I noticed the differences between the two countries.

It rains a lot in one country, but not so much in the other.

But other than that, I didn't really understand why it mattered that my parents were from different countries.

It continued to have a very peculiar effect on me.

I was born in one country and raised in the other.

When my family moved to Botswana, I was a kid who spoke Swazi fluently and no other language.

There, I was introduced to my new home, my new cultural identity, as a complete stranger, unable to understand anything about what my family or country was telling me, what traditions I should be working with --

But soon I gave up Swazi

When I returned to Swaziland, I continued to struggle with being less Swazi.

On top of that, I went through a very unusual adolescence when I was enrolled in a private school whose purpose was to make students less "African."

But I think my fascination with the concept of identity was born here, at this strange crossroads that belonged to two places at once -- not exactly to one or the other, but somewhere in the middle of this vast space at the same time.

I became obsessed with the concept of "one identity for all of Africa."

Since then, I've been reading books on politics, geography, identity, and trying to figure out what they mean.

At the same time, he maintained a deep interest in African philosophy.

When I started reading, I was drawn to the work of black intellectuals, like Steve Vieko and Frantz Fanon, who were grappling with complex issues like the colonial independence movement and black social consciousness.

Thinking that I had mastered these great ideas at the age of 14, I decided to listen to speeches by some of Africa's most iconic politicians: Thomas Sankara of Burkina Faso and Patrice Lumumba of the Congo.

I also read all the African fiction I could get my hands on.

When Twitter became available, I jumped into it with the enthusiasm of a teenage girl.

This was in 2011, as affordable data plans became readily available across South Africa and across the continent for smartphones and web surfing.

Our generation sent messages to each other on this platform, because all it takes is 140 characters and a little bit of creativity.

During long commutes, during lectures where we had to concentrate, during lunch breaks, we communicated as much as we could about the everyday realities of being African youth.

But of course, this luxury was not available to everyone.

So if you're a teenage girl from Botswana and you want to have fun online, you have to make one tweet in English.

Two, you can't just follow three people you know online.

I have to follow people from South Africa, Zimbabwe, Ghana and Nigeria

Then suddenly the world opens up

my world really opened up

I followed Africans traveling around the continent, taking pictures of themselves and posting them with the hashtag #MyAfrica.

Because back then, if you searched for "Africa" ​​on Twitter, on Google, on any social media site, all over the continent, you'd only get pictures of animals and white people drinking cocktails in resort hotels.

(Laughter) But by using this platform, Africans have acquired a kind of ownership in the field of tourism.

It could be an African taking a selfie on a beach in Nigeria.

It was an African in a cocktail bar in Nairobi.

It was just like the Africans I had come across in my travels across the continent.

We discussed African literature, politics, and economic policy.

But almost always, it always ended up in a Twitter discussion.

That's when I thought it was this

We felt like we were standing in the middle of something great, because for the first time, young Africans were able to discuss the future of their continent in real time, without the constraints of borders, finances, and overbearing governments.

It's a little-known fact that many people in Africa, on the whole, know far less about Africa than Westerners do.

This was happening by accident, but sometimes on purpose.

For example, under apartheid in South Africa, black South Africans were constantly being bombarded with the message that "any country dominated by blacks is doomed to failure."

Policies were put in place to convince blacks that they would be better off under white rule than under a free black state.

What's more, Africa's archaic colonial education system had been handed down from the 1920s without a second thought. At the age of 15, I could name all the different causes of the wars in Europe in the last 200 years, but I couldn't name the president of my neighbor's country.

To me, it's funny because, like it or not, the destinies of African people are deeply intertwined.

When disaster strikes and chaos strikes, the consequences affect us all.

When Burundians seek refuge from political turmoil, they come to our country and other African countries.

Africa has six of the world's largest refugee shelters.

What was once Burundi's problem now becomes Africa's problem.

For me, there are no problems with Sudan, or South Africa, or Kenya.

If we share our problems, why not share our successes?

how can i do that?

Well, in the long term, let's aim at increasing intra-African trade by removing borders and putting pressure on leaders to implement the regional agreements already signed.

But the most important way for Africa to share its success is to promote what we might call "social Pan-Africanism."

Pan-Africanism in the political sense already exists, and I'm not inventing something completely new here.

But political Pan-Africanism has always been a group of political elites in Africa.

Who will it be for?

Yes, almost exclusively for African leaders.

Instead, I'm talking about Africans in general and young Africans like me.

Pan-Africanism. We are full of creative energy and innovative thinking. We are full of creative energy and innovative thinking.

But with bad governance and unreliable institutions, all that potential would be wasted.

In a continent where a handful of leaders have held power longer than the majority of the population is of age, there is a hunger for something new and something that works.

I think that's social Pan-Africanism.

My dream is that African youth will no longer allow borders and circumstances to stifle innovation in Africa.

My dream is that when young people in Africa come up with something great, they don't say, "Well, we can't do that in our country," because that's how they give up.

My dream is that young people in Africa will begin to realize that all of Africa is our canvas, our home.

With the Internet, we can start thinking together, we can start innovating together.

In Africa, they say, "If you want to go fast, go alone, but if you want to go far, go together."

I think social Pan-Africanism is about how far we can go together.

and it has already started

Access to these online networks will give young people in Africa a voice they were forced to steal.

now we have a platform

Before that, if you wanted to hear the voices of young people in Africa, you would go to the 65-year-old youth minister.

Until now, if you wanted to somehow speak out about tyrannical politics, you had to be forced to protest and hope that some Western newspaper would take notice of you.

But now we have the opportunity to support each other in ways never before possible.

We're demonstrating against ridiculously high school fees, South African students,

Zimbabwean women marching to parliament

We support illegally detained Angolan journalists.

For the first time ever, Africa's pain and longing can be witnessed by those most compelled to speak to it: other Africans.

I believe that as one social pan-Africanist thinks and uses the Internet as a tool, we can begin to help each other, and ultimately help ourselves.

thank you

(applause)

128 years ago, slavery was completely abolished around the world, and 53 years ago Martin Luther King gave his "I have a dream" speech.

But we still live in a world where the color of our skin not only determines our first impression, but that impression casts a permanent shadow.

I was born into a family of people with different skin tones.

My father had a maid from his mother and inherited dark chocolate skin.

my father was adopted by my grandparents

The head of the household, my grandmother, has porcelain white skin and white cotton hair.

My grandfather is somewhere between vanilla and strawberry yogurt, and so are my uncles and cousins.

My mother has cinnamon skin and was born to a Brazilian hazelnut and honey skinned woman and a man with dark coffee and milky coffee skin.

mother has two sisters

One has toasted peanut skin, and the other, who is also an adopted child, has pancake-like skin in a more beige shade.

(Laughter) Growing up in a family like this, skin color wasn't important to me.

But I've come to realize that things are different in the world.

Skin color had many meanings.

I remember having a lot of mixed emotions during my first painting class at school.

It was an exciting and creative time, but I didn't understand that there was only one color of Hadairo colored pencils.

I have skin too, but it's not pink

I have brown skin, and people have told me I'm "black."

At 7 years old, I was so confused about skin color.

Later, when I took my cousin to school, I was often mistaken for a babysitter.

I was helping in the kitchen at a friend's party, and they thought I was a maid.

I've even been treated like a "whore" just for walking on the beach with my European friends.

And many times, when I went to visit my grandmother or a friend in an upper-class building, I was told not to use the main elevator.

Because after all, with this skin color and this hair, you can't belong in some places.

In a way, I've grown accustomed to it, and I've embraced it.

But somewhere in my heart, I was hesitant and struggling

Many years later I married a Spaniard

not just spanish

I chose someone who, when sunburned, would be the color of a lobster.

(Laughter) Since then, I've been haunted by new questions.

What skin color will your child have?

As you can see, I don't care

But as I thought about it, my experience combined with that experience led me to start a personal project as a photographer.

Thus "Humanae" was born

Humanae is about our natural skin color, not the false colors like white, red, black and yellow that are associated with our race.

It's like a game of questioning our codes.

It's a work that's evolving from a personal story to a world history.

I photograph my subject in front of a white background

Then you extract an 11-by-11-pixel square from the nose, fill the background with that color, and find the matching color in the Pantone color swatch.

Starting with family and friends, and thanks to an outreach via social media, more people have joined the adventure.

The reason I thought the Internet would be the main place where I would present my work was because I wanted to make the concept open so that anyone could click "share" on their computer or in their minds.

The project got bigger and bigger

It's been welcomed everywhere -- invited to exhibit, and actually printed and hung in galleries, museums, and so on.

it was a natural progression

One of my favorites is when Humanae take over public space, appear on the street, become a hot topic, and create a sense of community.

I've photographed over 3,000 people in 19 cities in 13 countries around the world.

They range from people on Forbes lists to refugees who crossed the Mediterranean in a small boat.

In Paris, we filmed at UNESCO headquarters and shelters.

Some are from Switzerland, some are from the slums of Rio de Janeiro.

There are people with different beliefs, different gender identities, different disabilities, some newborns, some terminally ill.

We are all building Humanae.

These pictures make us rethink how we see each other.

As modern science questions the concept of race, what does it mean for us to be black, white, yellow, and red?

Is it the eyes, nose, mouth or hair?

Or does it have something to do with where you're from or your nationality - your bank account?

This personal project led to the discovery

Suddenly I realized that Humanae could help many people.

It becomes a mirror for people who don't fit into any classification.

The great thing is that people have started sharing their thoughts on the work with me.

I've received hundreds of comments, so I'd like to share them with you.

A mother of an 11-year-old girl -- a mother of an 11-year-old girl wrote me, "It's been very helpful in building her confidence, because last weekend she was told by a girl friend, 'You're not Norwegian and you shouldn't live in Norway.'

That's why your work holds such a special place in my heart."

One woman shared a self-portrait on Facebook and wrote, "In my entire life, no one in the world has been able to fit me into any group, stereotype, or framework.

you should stop now

Instead of putting yourself in a mold, ask yourself, 'How would you classify yourself? ' and I will answer, 'Hello, I'm Maciel.

I'm Dominican-Dutch, and I'm a bisexual woman who grew up in a multicultural family.'" In addition to this unexpectedly moving response, Humanae finds new raison d'etre in many places.

I'll give you a few examples of how illustrators and art students use them for sketching and research.

Because it is a material that collects a lot of various faces

Researchers in anthropology, physics, and neuroscience are using Humanae in a variety of scientific approaches, including human ethnicity, optical physiology, facial recognition, and Alzheimer's disease.

The most significant impact of this project was the Humanae on the cover of Foreign Affairs magazine, one of the most important political magazines.

Speaking of foreign affairs, I found the perfect ambassador for the project.

are the teachers

Teachers are using Humanae as teaching materials.

The passion of the teachers has allowed me to return to my painting class, this time as a teacher.

My students, both adults and children, paint self-portraits and strive to find their own colors.

As a photographer, I've found that I can be a channel of communication for other people.

Personally, for Angelica, every time I take a picture, I feel like I'm sitting in front of my therapist.

All the conflicts and fears and loneliness that I once felt-

turns into love

The last country -- the last country in the world to abolish slavery -- the country where I was born -- Brazil.

Efforts still need to be made to eliminate discrimination

It's the same thing in other parts of the world, and discrimination doesn't just go away.

thank you

(Applause) Thank you.

(Chris Anderson) It's a strange story because your software, Linux, is in millions of computers.

It powers a good chunk of the internet.

Furthermore, there are about 1.5 billion Android devices in actual use.

Each one of them has your software in it.

this is amazing

I thought that the development headquarters would be a huge facility.

I was surprised when I saw this photo

This is the — Linux World Headquarters, right?

(Laughter) (Applause) (Linus Torvalds) It doesn't look like much, does it?

The part of this picture that's most interesting and that a lot of people react to is that treadmill desk.

It's the most interesting thing in my office, but I don't use it anymore.

i think these two are related

The way I work —

I want to get rid of external stimuli

You can see the walls are light green.

I was told it was the color they use on the walls in mental hospitals.

(Laughter) It's a soothing color.

I don't have a computer here, just a display, but my main concern with my computer is that it doesn't have to be that powerful -- that's fine, but it needs to be completely silent.

I know people who work at Google, and they have small data centers in their homes, and I don't.

my workplace is pretty boring

i'm sitting there alone and quiet

When the cat comes in, it sits on my lap

I like hearing cats purr, but I don't want to hear computer fans.

Chris: That's amazing. To be able to work that way and still be able to run this gigantic technology empire, it's an amazing testament to the power of open source.

How did you come to understand open source and how did it lead to the development of Linux?

(Linus) I'm still working alone.

At home alone, sometimes in a bathrobe

In that picture, the photographer came, so I dressed up --

(Laughter) I've always worked that way.

That's how I started Linux

Linux didn't start as a collaborative project.

It started as one of the many projects I was doing for myself, trying to build something I wanted, but more than that, I really enjoyed programming.

Even after 25 years, we still haven't reached the final destination of our journey.

I was looking for a project for myself, and open source wasn't in my sights.

someday -

As the project got bigger, I wanted to show it to people.

It's almost like "Hey, look at what I've made!"

It wasn't really a big deal back then.

We did, but it wasn't open source at the time.

Even though we released the source, we had no intention of taking the open source approach to improving it as we do today.

It was more like, "I've been working on this for half a year, and I'd love to hear your thoughts."

Then other people came

I had a friend at the University of Helsinki who was doing open source, what was mostly called "free software" back then, and he told me to use open source licenses, because there was already something like that.

i've been thinking about it for a while

I was worried about the commercial interests coming up.

One of the fears that many people have when starting out is that someone will take advantage of their work.

I decided to do it.

And then — (Chris) and someone contributed the source code and said, "Wow, that's interesting. I wasn't expecting this.

We can improve this.”

(Linus) The original contribution was not the source code, but rather the idea.

Even if it's just that someone looks at your project -- and I'm sure that's the case with other things as well, especially in programming -- to have someone look at your program enough that they can show interest in it and give you feedback and ideas.

it was a big deal for me

I was 21 at the time, and I'd already been programming half my life.

Before that, my projects were completely personal, and getting comments and feedback on my code was amazing.

Before I started receiving source code, there was this big moment for me, and I thought, 'I love being human.'

Please don't get me wrong, I've never been a social person.

(Laughter) It's not that I really like people.

But I like people who comment and collaborate on my projects.

That's what made it so much bigger.

Chris: Was there a 'this moment'? I saw it grow and it started to take off and I was like, "Wait, this is not just a personal project that gets nice comments, but it could be something really big that's going to explode in the tech world at large."

(Linus) No.

The big change for me wasn't when it became huge, but when it became small.

I went from doing it alone to having 10 or 100 people involved, and that was the big change for me.

Everything else happened gradually

100 to 1 million was not a big deal.

No, it might be a big deal. (Laughter) If you were trying to sell your work, it would be a big deal.

But a big part of it is that if it's the technology, the project itself, that's what you're interested in, then the community can do it.

And then the community slowly grew

It's not like there was a specific point where I was like, "Wow, that's a big success!"

CA: Every tech guy I've talked to appreciates you for making a big difference in how they work.

And that includes not only Linux, but also Git, a system for managing software development.

Tell me about your role in it

Linus: The problem we had was that after a while it started showing up that 10 or 100 people

To grow from working on a project to 10,000 people -- right now, just on the kernel alone, there are 1,000 people working on each release, and that happens every couple of months.

some people don't do much

A lot of people make very small changes.

How did you organize a change of such magnitude?

it's been a pain for so long

There are various projects that are just for source code control

CVS was the most commonly used one, and I hated it, and I refused to touch it, and I tried to do something radically different and interesting, and people hated it.

(Laughter) There were thousands of people who wanted to work with me, and it was kind of a breaking point, and I was kind of stuck. I wasn't flexible enough to work with thousands of people.

Git is my second big project, but I built it just to maintain my first big project.

that's how i work

Sometimes I write programs just for fun, but I want to make programs that are useful, so all of my projects were exactly what I needed myself to do, Chris. So it was an unexpected result of your desire to not have to work with too many people on Linux or Git.

(Linus) That's absolutely true.

(Laughter) (Chris) No, I'm surprised. (Linus) Absolutely.

(Applause) (Chris) You changed technology not once, but twice.

I've got some clues -

This is a picture of you as a child doing a Rubik's Cube.

You said you've been programming since you were 10 or 11.

Were you a computer genius or a geek or were you a school star who could do anything?

What kind of child were you?

(Linus) I think he was a typical nerd.

At the time—

I was not a friendly person.

that's my brother

Clearly, I was more interested in the Rubik's Cube than my brother was.

(Laughter) My sister isn't in this picture, but when we had family gatherings, it wasn't that big, we had two cousins, but she would prepare me ahead of time.

Before I enter the room

I'm a tech idiot anyway

I liked computers, mathematics, and physics.

I was good at

i don't think i was flying

My sister says that the most extraordinary thing about me is that I never give up.

Chris: Let's hear a little more about that. Sounds interesting.

to not give up

It's not about being a technical master, it's not about being smart, it's about being stubborn, isn't it?

(Linus) You must be stubborn.

What that means is that when you start something, you don't say, 'Okay, let's do something else cool.'

So do other aspects of my life

I lived in Silicon Valley for seven years

All the while working for the same company in Silicon Valley.

never heard of that

Silicon Valley is not that kind of place.

I think the whole point of Silicon Valley is people jumping from job to job and getting mixed up.

But I'm not that type of person

Chris: But in the development of Linux, that stubbornness sometimes caused friction with other people.

let's talk about that

Is it essential to maintain the quality of what you are making?

What do you see from your point of view?

(Linus) I don't know if it's essential.

Coming back to not being a social person, sometimes I —

Somehow, I can become "myopic" about other people's emotions, and that's why I say things that hurt other people.

I don't think that's a good thing.

(Applause) On the other hand, some people tell me that I should be kinder to people.

When I try to explain and say that I don't know if you're kind to people, but you should be more aggressive

(Laughter) What I'm trying to say is that people are different.

I'm not very social, and I don't think it's a good thing, but that's who I am.

What I really like about open source is that it allows different people to work together.

You don't have to like each other, sometimes you really hate each other.

Sometimes we argue very violently.

After all, it's -- it's not even acknowledging our differences, but we're just interested in things that are very different.

I was just talking about the fear of commercial people who prey on their own work, and it quickly became clear that these commercial people are really nice people.

They do a lot of things that I wouldn't do at all, and they have very different goals than I do.

I didn't like the way they tried to use open source.

Because it's open source, they can do it, and the combination actually works beautifully.

I think it works the same

We need people who are good people, communicators, people who are warm and friendly, like -- (Laughter) people who really give you a hug and let you join them.

not everyone

i am not

i am interested in technology

Some people are interested in user interface

I can't do it for the sake of saving my life

If I was stranded on a deserted island and the only way I could get out of it was to create a pretty user interface, I would die there.

(Laughter) It means that there are different kinds of people. I'm not trying to make excuses, I'm just trying to explain.

Chris: When we spoke last week, you mentioned another trait of yours that I found very interesting.

it's called sense

I have two images

This program is an example of not having very good taste, and you can tell at a glance that this program has better taste.

What's the difference?

Linus: How many of you have ever programmed?

(Chris) There are so many

Linus: If you've raised your hand, I'm sure you've created a one-way list.

This not-so-tasteful way of doing things is taught in elementary programming.

You don't have to understand this code

The most interesting point here is the last if statement

What happens with a unidirectional list is that here we're trying to remove an existing element, but it's different whether the element is the first or not.

For the first element, we have to rewrite the pointer to the first element,

In the case of intermediate elements, it is necessary to rewrite the pointer of the previous element

There are two completely different cases.

(Chris) In that respect, this one is better.

(Linus) This is better

missing if statement

I don't care if you don't know why there's no if statement, but what I want you to know is that sometimes you can look at the problem differently and rewrite it to turn a special case into a general case.

That's good code

this is very simple

It's introductory code, it's not important

but the details are important

The hallmark of someone I want to work with is that they have good taste.

This trivial example is too small to make much sense,

Good taste is something bigger

Good taste means seeing big patterns and intuitively knowing the right way to do things.

Chris: Let's sort things out.

You have good taste — something that makes sense to people in the software world

You -- (Laughter) (Linus) I'm sure there are some of you out there who know!

Chris: You're a very smart programmer and you're stubborn.

but there must be something else

you changed the future

I think you have a big vision for the future.

Are you a visionary?

Linus: I've been at TED for the last two days and I've been feeling a little uncomfortable, and there's been a lot of talk about vision.

i am not a visionary

I don't have a five-year plan

I am an engineer

It's perfectly fine to be with people who walk around and stare at the clouds and stare at the stars and say, "I want to go there."

But I'm looking at the ground and I want to do something about the hole in front of me before I fall.

i am that kind of person

(Cheers) (Applause) (Chris) Last week, we talked about these two.

Who are they and what do they think?

Linus: This Tesla vs. Edison thing is kind of a cliché in the tech world, but Tesla is seen as a visionary scientist, a great idea man.

everyone loves tesla

Some people use that name as their company name.

(Laughter) Edison, on the other hand, is much more mundane and often criticized, and his most famous quote is, "Genius is one percent inspiration and ninety-nine percent perspiration."

I'm on Edison's side, although you may not like it very much.

When you compare the two, Tesla has won hearts and minds these days, but which one really changed the world?

Edison may not have been a nice guy. He's doing a lot.

But I think I'm closer to Edison than Tesla.

CA: The theme for this TED talk is bold, ambitious, big dreams.

you are the opposite

(Linus) I'm trying to pull back a little.

(Chris) That's good

(laughs) welcome

Google and other companies are making billions of dollars from your software.

Does that make you uncomfortable?

(Linus) Just a little

There are several reasons

I'm doing well

One thing is that there is no problem

Another reason is that if we hadn't made it open source and made it freely available, Linux wouldn't be what it is today.

That has led me to experience things I'm not good at, like speaking in front of people, but I think that's also an experience.

Really

So there's a lot going on that makes me a happy person, and I think I made the right choice.

CA: So this is the last question, is the idea of ​​open source fully realized in today's world, or is there more that can be done?

(Linus) I can't say either way.

I think the reason open source works so well in programming is that programs are, after all, black and white.

There's often a good way to tell if this is good or this isn't good.

Either the program works or it doesn't, there's not much room for debate.

I still argue a lot.

There's been a lot of discussion in other domains about open politics and so on, but sometimes it's hard to say that the same principles apply to other domains.

Open source in science seems to be making a comeback.

Although it was open in the beginning

And then there's the problem of very expensive journals that eventually become closed, and things like that.

Open source is making a comeback in science with things like arXiv and open access journals.

Wikipedia also changed the world

There are other examples, I'm sure there will be more, but I—

CA: You're not a visionary, so anticipation isn't your role.

(Linus) No!

(Laughter) You're going to do that, right?

(Chris) Absolutely

Linus Torvalds Thank you Linux Thank you Internet Thank you Android

Thank you for coming to TED and telling us so much about yourself.

(Linus) Nice to meet you

(applause)

What I'm going to tell you today is something that everyone believed was impossible.

It's about a thriving startup business thriving in an unlikely place: the U.S. government.

This startup is beginning to radically reinvent government business.

But before we get to the point, what is the problem first?

What made me aware of the problem was the number 137.

137 is the average number of days it takes the VA to process paperwork and veterans receive their benefits

137 days

In the first place, the application process requires searching between more than 1,000 websites owned and operated by the United States government and over 900 phone numbers.

we live in a time of rapid change

Private companies are constantly changing and improving

Companies are eliminating all the inconveniences in our lives.

I can have a hot, gluten-free meal delivered to me within 10 minutes from the comfort of my sofa in my apartment with just one phone call.

On the other hand, working mothers who rely on government food subsidies to support their families have to fill out very complex and cumbersome forms, and they may not even be able to do it online.

If I can't do this work on the couch, I have to take hours or days off from work, and I can't do that.

One of the key challenges of our time is the growing divide between those who benefit from the technological revolution and those who are left behind.

Students wanting to go to college, single mothers in need of medical care, veterans returning from the battlefield.

They don't get service exactly when they need it.

For people like them, government isn't just about presidential elections every four years.

It's a lifeline to provide the services we need and are entitled to.

Frankly, the government has to somehow catch up.

I'm complaining

(Applause) I've never been enthusiastic about this issue.

In 2008, when we helped President Obama run for president, we brought to politics what had been successful in the tech industry.

It attracted the most donations and volunteers and the most votes in campaign history.

We were a cutting-edge startup that changed politics ever since.

So when a small group of us were asked by the president to take the reform approach directly into the government, we knew it wouldn't be easy, but we went out on our own initiative and full of motivation.

On my first day in Washington, the day I started working for the government, I walked into the office and was handed a laptop.

Inside was Windows 98

(Laughter) Since the government last updated its operating system, there have been three presidential elections that occur every four years.

Three times!

It was only then that I realized that the problem was far more serious than I had imagined.

let me explain the situation

The United States government is the largest organization in the world

Governments spend over $86 billion a year on IT projects

By comparison, that's more than the total annual spending of all areas of the venture capital industry.

The problem here is that we don't get what we pay for in taxes, because 94 percent of government-sponsored IT projects are either over budget or behind schedule.

94%!

For those of you who want to remember numbers, 94 is almost 100.

(Laughter) There's another problem: 40 percent of projects never see the light of day.

completely discontinued or abandoned

This is a situation that makes any organization question the raison d'etre of any organization, because any government that does what it plans to do will almost certainly fail.

If the status quo is the highest risk, there is no alternative but to radical change.

So what should we do?

How can we improve?

Ironically, the answer was so close to home, because here in America we have the people and the ideas that have changed the face of the world in 20 years.

What if getting a student loan or getting a veteran's benefit was as easy as asking for cat food to be delivered?

What if there was an easy way for the entrepreneurs and innovative people who have been reinventing the tech industry to come together and help reinvent government?

This is where the story of what we've discovered about changing government in exciting new ways begins.

Introducing U.S. Government Digital Services

U.S. Government Digital Services is a new network of startups, a collection of independent teams, all over the government, organized and revolutionary.

Our mission is to make world-class digital services available to governments, accessible to everyone: students, immigrants, veterans, children, seniors, and dramatically lowering costs.

The bottom line is that we're trying to build a better government, by the people, for the people.

For us—(Applause) Thank you.

(Applause) Everyone wants a cool government, right?

"Politics" doesn't matter to us

What's important is that the government works, because we have only one government.

(Applause) Our team is -- it's funny, it's kind of like the Peace Corps, DARPA, and Special Forces SEAL.

It's kind of like a peace corps for geeks, but instead of traveling to faraway and exotic places, they're sitting in their rooms for hours at their computers, trying to rebuild the fabric of democracy.

(Laughter) Our strategy at U.S. Government Digital Services is very simple.

First, we recruit the top talent in our country to work for the government for a short period of time.

They are the ones who have made our technology industry one of the most innovative in the world, through the creation of products and companies.

And then we're going to team up with those at the heart of the tech industry with the people who are committed to making changes on the ground in government.

Third, strategically place them in a way that targets government services that are essential to society and that make a difference in people's livelihoods.

And finally, there's the strong backing up from the top, starting with the executives of the organization, all the way up to the president, and supporting them to improve the service.

These teams are beginning to radically change the way government works.

When we study the typical patterns of reform, we find that the most common patterns are rather simple.

It's about taking what's normal and standard in one industry and applying it to another industry where it's a breakthrough.

For example, Airbnb took something that's taken for granted in the hotel industry and transformed my apartment.

The U.S. Government Digital Services effort is exactly the same.

Silicon Valley and the private sector have gone to great lengths to learn how to create digital services on a global scale that are cheaper and more satisfying for users.

Fortunately, this effort is going well.

You can see it by looking at the results of some of our early projects, such as the restructuring of HealthCare.gov, which went astray.

The HealthCare.gov improvement was our first work using this method, but now we're applying the same method to so many important government services for the public.

Let me show you a little bit of team bragging here.

We had the best people on staff from companies like Google, Facebook, Amazon, Twitter, and they all chose to help the government.

And what's really amazing is that not only are they intelligent, but they're also enthusiastic and kind.

In addition, more than half of the staff are women.

(Applause) The best way to understand our strategy is to take a case study and see if it's actually working in society.

Let me give you two quick examples.

The first is the case of immigration.

This is a normal immigration application form

As you can imagine, almost everything is paper-based.

It takes a minimum of 6-8 months to process the application.

Paper applications are transported thousands of kilometers between more than six processing centers.

Here's what happened about 10 years ago, when the government thought that by putting the system online, they could save the tax money they collected from the people and provide better services.

After six years and $1.2 billion, we just couldn't make it work, $1.2 billion.

It's possible that the agency responsible, the Citizenship and Immigration Service, was still pouring money into programs that weren't going to succeed.

I'm sorry, but it's common

That's the current "status quo"

but they were different

Enthusiastic staff in the department stood up and demanded change.

We sent out a group of just six people, which many people don't know, which is the same number that we had when we turned HealthCare.gov back on - just six people.

They all worked together to help the Immigration Service incorporate more modern business and development practices into this project.

In a nutshell, it's a way to reduce risk by breaking a large, multi-year project into smaller pieces, and get results every few weeks instead of waiting years in the dark.

And within three months of the team being in the field, we were able to publish the first results.

The first result is the “I-90” application

Used for renewal of permanent residency

Renewal is very important for immigrants with permanent visas.

A permanent resident visa is a proof of identity, a work permit, and the ability to live in the United States.

So I don't want the government to wait half a year to finish the renewal process.

But I'm happy to announce that you can finally apply for permanent residency renewal completely online, without any paper documents.

It's faster, it's cheaper, and it's a better user experience for applicants and government officials.

(Applause) I'll give you one more quick introduction.

Fall 2015 We released new citizenship test exercises

To become a US citizen, you must pass a citizenship test.

It can be very stressful for test takers.

That's why we're publishing easy-to-use, easy-to-use tools to help you prepare for the test, calm your fears, and empower you to pursue the American Dream with confidence.

All of this work with immigration is all about humanizing the red tape.

The other day, an enthusiastic field worker said something very meaningful.

“I have never felt so hopeful about a project in my time working for the government,” he said.

Someone who's been doing this job for 30 years.

This is exactly the hope, the cultural change that we are trying to create.

As a second example, let's take veterans again, the effort to make a Department of Veterans Affairs worthy of their service and sacrifice.

I'm proud to announce that just a few months ago we launched a beta version of our new website, Vets.gov.

Vets.gov brings together all the online services that veterans need in one simple, easy-to-use site.

Just one, not thousands of sites.

It's still in the early stages of production, but it's a big step forward, because it's the veterans themselves who have helped us the most.

It's obvious, and you think it's obvious, but unfortunately in the world of government, it's not.

Most production decisions are made by the relevant committees, who represent the best interests of the users, but not the users themselves.

So my colleagues at the Department of Veterans Affairs went out and looked at the data, and spoke directly to veterans, and started simple and small, focusing on the two services that mattered most to them: education benefits and disability coverage.

I'm proud to say that the site is now up and running. Once the team streamlines more services, we will move everything over here and shut down the original site.

(Applause) This is what change looks like in 2016.

When I walked into the Oval Office for the first time, I saw these words that the president had embroidered on the carpet.

Kennedy's famous words

"There is no question of human destiny that man cannot solve."

That's right

we have the tools to solve the problem

As a society, as a country, we have tools that enable us to work together and solve problems.

it's certainly difficult

Especially if you refuse to give in to the belief that nothing will change and you have to fight it.

But in my experience, hard things are worth doing, because if we don't do them, who will?

It's up to each and every one of us, because government is not an abstract organization or concept.

government is us

(Applause) It's no longer a question of whether change can happen.

The question is not "Can we do it?"

"Are we going to do it ourselves?"

How are we all?

Thank you very much

(Applause) Thank you.

(applause)

When I was seven years old, a nice-looking adult asked me, "What do you want to be when you grow up?"

I proudly answered, "I'm an artist."

"No, I can't," he says. "You can't make a living as an artist."

Little 7-year-old Picasso's dreams were shattered

But I picked myself up and started looking for new dreams, and eventually I started thinking that maybe I could be a scientist, like the next Einstein.

(Laughter) I've always loved math and science, and later programming.

So I decided to study programming in college.

In my sophomore year, my computer graphics professor showed me an amazing short film.

It was the first computer animation I'd seen in my life.

I was mesmerized, and I watched the movie with devotion, and fireworks exploded in my head, and I thought, "This is what I want to do with my life!"

The idea that all the math, science, and programming that I've been learning about could be used to create these worlds and characters and stitch them together in stories felt magical.

Exactly two years later, I started working at Pixar Animation Studios, the company that made that movie.

It's where I learned how to actually make a movie.

We create three-dimensional (3D) worlds in computers to make Pixar movies.

It starts with the dots, the dots make the lines, the lines make the faces, the characters come, or the trees and the rocks, and finally the forest.

Because this is a three-dimensional world, you can move the camera around in it.

All this fascinated me

And that was my first experience with writing.

Lighting is the placement of light in a three-dimensional world.

There is an icon that allows you to move the light source

You can see here that I've added a light source, and I'm going to use software to do the rough lighting, I'm going to add shadows, I'm going to place the light source.

As I place the light source, I think about what it would look like in the real world, but I try to balance it with what I need artistically and narratively.

It starts out looking like this, and over the course of weeks of work, tweaking it and moving it around, the rough looks like this, and the final version looks like this.

There's a moment in writing that totally captivated me.

it turned into this

That's the moment when all the pieces fit in. Suddenly the world comes to life, as if it were a real place.

This moment will never fade, especially for a little seven-year-old girl who wanted to be an artist.

As I learned more about light, I discovered many different ways to use it: light that tells a story, light that tells a time, light that creates atmosphere, light that guides the audience's eye, light that makes a character stand out, and light that stands out in a cluttered set.

Did you notice "Wally"?

(Laughter) I'm here.

As you can see, you can create any world you want inside a computer.

You can make a world of monsters, you can make robots fall in love, you can make pigs fly.

(Laughter) This world is amazing, but unbridled artistic freedom creates chaos.

It can also create improbable worlds and movements that make the viewer uncomfortable.

To prevent that, we put on the reins of science.

We use science and the real world as our backbone, so that we don't stray from something we can relate to and recognize.

"Finding Nemo" is a good example of this.

Most of the movie is about underwater

How do you make it look like it's in water?

In early research and development, we took underwater footage and recreated it in CG.

And then I took a closer look at what elements made it look like it was underwater.

One of the key factors was how light travels through water.

We've taken this physics and programmed the light, first the visibility underwater, then the effect on color.

The one in the foreground is full-color and colorful,

As light travels deeper into the water, it loses red wavelengths and then green wavelengths, leaving only blue at depth.

There are two other important elements in this video.

The first is the swell and rippling of waves, the invisible currents of water that sweep away microscopic particles in the ocean.

The second is caustic—

This is a ribbon of light, like the kind you see at the bottom of a swimming pool, and it's what happens when the sun's rays are refracted by the waves and ripple peaks on the surface of the ocean.

Here the streak of light

It gives you color depth cues that tell you which direction is up, even when you can't see the ocean.

Another cool thing to see here is that the only light that hits the particles is the caustic, which appears and disappears as the particles enter and leave the ribbon of light, adding a subtle, magical sparkle to the underwater world.

I hope you've seen how we use science to constrain artistic freedom through the physics of water, light, and motion.

But instead of just relying on

We looked at each element and thought which ones had to be scientifically correct and which ones could be adjusted according to the story and mood.

We realized early on that there was room for leeway with color.

This is an underwater scene with traditional colors.

Here we've taken Sydney Harbour, and color-adjusted it toward green to match the sad mood of what's happening.

Looking deep underwater is very important in this scene, so that you can see what the East Australian Current is like and what the sea turtles are doing on that roller coaster.

So we're tweaking the visibility of ocean currents to extremes that would be impossible in the real world.

Because ultimately, we're not trying to recreate a world that's scientifically accurate, but we're trying to create a believable world that the viewer is immersed in and feels like they're actually in the story.

We use science to create amazing things.

We use storytelling and artistic methods to take you into a world full of surprises.

This Wally is a great example of that.

he sees beauty in simple things

But when it came to lighting, he got me into trouble.

We insisted on making Wall-E a realistic robot, and made his binoculars optically nearly perfect.

(Laughter) Binoculars are Wall-E's most important staging device.

He doesn't have a face, and he doesn't have a traditional line of dialogue, for that matter.

Animators have to rely on binoculars to direct his acting and emotions.

We started lighting, but then we realized that the three lenses in the binoculars created complex reflections.

Wally has glassy, ​​lifeless eyes.

(Laughter) Now, the stark eyes are basically the worst way to convince the viewer that robots have personalities and that it's possible to fall in love.

So we set out to find a way to solve the reflection problem with these optically perfect binoculars while still maintaining the very robotic part.

Let's start with the lens

There's a flat front lens, there's a concave lens, and there's a convex lens.

When the three come together, you can see multiple layers of reflected light, like this.

I've tried weakening them and shutting them down, but nothing has worked.

As you can see, sometimes I need to project something specific into Wally's eyes -- usually Eve.

For that reason, we can't just project an abstract image through a lens.

I put Eve in the first lens, put it in the second lens, and it didn't work.

So I tried dimming the light, but it still doesn't work.

Then came the moment when I said, "This is it!"

I was adding light to Wall-E, and it accidentally fell into my eye.

Can you see the gray aperture blades illuminated?

All of a sudden, these diaphragm blades popped out from behind the reflections, solving a problem that otherwise couldn't have been solved.

Now we can say that Wally has eyes.

As humans, we have white eyes, colored irises, and black pupils.

Wally now has black eyes, gray aperture blades, and black eyes.

All of a sudden, it feels like Wally has a soul, as if an emotional personality exists within him.

Towards the end of the movie, Wally loses his personality, essentially heading towards death.

It was the perfect time to bring back those lifeless, glassy eyes.

In the next scene, Wally comes back to life.

We call the light back to bring back the aperture blades, and the cute, emotional robot we've come to love is back.

(Wally) Eve?

There's beauty in these unexpected moments, when you find the key to unlocking your robot's soul, when you discover what you want to do with your life.

The jellyfish in "Finding Nemo" was one of those moments for me.

Every movie has scenes that I struggle to put together.

this was one of those scenes

The director had a vision for this scene, and it was inspired by beautiful footage of jellyfish in the South Pacific.

As things progressed, we began to struggle

The review with the director went from the usual look and feel to questions about numbers and proportions.

Maybe it's because it's based on things in the real world that aren't normal, or maybe it's just because we've lost our way.

I learned to use my head instead of my eyes and science without art.

Scientific shackles were blocking this scene,

No matter how dead I was, I believed that this scene would be beautiful.

When it came to the writing stage, I worked hard.

As we balanced the blues and pinks, something promising emerged with the caustics dancing on the jellyfish and gently rippling bands of light.

I went to work one morning and was reviewing last night's work.

got excited

And then I showed it to my lighting manager, and she was thrilled too.

I immediately showed it to the director in a darkroom full of about 50 people.

In a director's review, it's common to first ask for something nice to say, and then ask for comments and corrections.

Then, if possible, I'd like to get instructions to proceed to the final next stage.

After my introduction, I showed the jellyfish scene.

The director was silent for an embarrassingly long time.

Enough to think "oh this might be hopeless"

then he started clapping

Then the art director started clapping

By the end, the whole room was filled with applause.

I live and write for this moment

It's the moment when everything comes together and we have the world we believe in.

Using mathematics, science and programming to create wonderful worlds

Bring to life with story and art

It is this interweaving of art and science that elevates the world to a world of wonder, a place of soul, a place of belief, a place where what one imagines can become real, and a world where a girl suddenly realizes that she is not only a scientist, but also an artist.

thank you

(applause)

Cancer affects all of us, especially those that recur over and over again, those that are highly invasive, those that are drug-resistant, and those that defy treatment with the best possible drugs.

So, working at the molecular level, the smallest scale approach can lead to exciting new ways to combat the most aggressive forms of cancer.

Cancer is a very smart disease

Fortunately, some cancers are relatively well-understood with well-established drugs and surgeries.

But there are other types of cancer that don't respond to these approaches, surviving or recurring even after an onslaught of cancer drugs.

A cancer so aggressive like this could be likened to a cartoon supervillain.

They're smart, they're adaptable, they're really good at staying alive.

Like most supervillains these days, their special powers came from genetic mutations.

Genes mutate in tumor cells, giving cancer cells new and unimagined ways to survive, allowing cancer cells to survive even with the best anticancer drugs.

One example is the genetic trick of kicking out the anticancer drug before it has any effect, even if it hits the cancer cells.

Imagine a cell cleverly pumping out anticancer drugs.

This is just one example of a genetic ruse in the hands of the bad guy cancer.

It's all because of genetic mutations

There are super villains with incredible special abilities.

We need powerful new methods of attack.

In fact, genes can be turned off.

The key is the siRNA, known as a set of molecules.

siRNAs are short sequences of the genetic code that tell cells to block certain genes.

Any siRNA molecule can turn off a specific gene in a cell Any siRNA molecule can turn off a specific gene in a cell.

In the years since its discovery, scientists have been very enthusiastic about how this gene blocker could be applied in medicine.

there was a problem

siRNA works well inside the cell

When exposed to the enzymes present in our bloodstream and tissues, they are degraded within seconds.

On its journey through the body, it must be enveloped and protected all the way to its ultimate destination, inside the cancer cell.

and this is our strategy

First, cancer cells are given gene blockers, siRNAs, to suppress survival genes, and then completely overwhelmed with anticancer drugs.

But how do you do it?

Using molecular engineering, we can design powerful weapons that can actually travel through the bloodstream.

It has to be small enough to pass through the bloodstream, small enough to penetrate tumor tissue, and small enough to be taken up by cancer cells.

To do this job well, the particles have to be about one-hundredth the size of a human hair.

So let's take a closer look at how we make these nanoparticles.

Shall we start with the core of the nanoparticle?

There are tiny capsules that contain chemotherapy drugs.

This is the poison that actually kills the tumor.

Around this nucleus, we wrap a very thin nanometer-scale siRNA blanket.

this is our gene blocker

siRNAs are strongly negatively charged, so they protect the nucleus with a layer of positively charged polymers.

These two oppositely charged molecules attract and stick together, and this creates a protective layer that prevents the siRNA from breaking down in the bloodstream.

It's almost finished

(Laughter) But there's another big obstacle that we have to think about.

In fact, it's probably the biggest obstacle.

How do you deploy this powerful weapon?

Any effective weapon must be aimed at its target - we must aim this powerful weapon at the bad cells that live in tumors.

But our bodies have a natural immune defense system, and cells travel through our bloodstream to find, destroy, and eliminate foreigners.

You see, our nanoparticles are perceived as foreign objects.

So you have to get past the tumor's defense system and sneak it in.

By disguising the nanoparticles, we have to get past the mechanisms that try to remove this foreign material.

So we decided to add another negatively charged layer around the nanoparticles, which helps in two ways.

First, this outer layer is one of the water-holding polysaccharides in the body that are naturally negatively charged.

This creates a film of water molecules around the nanoparticles, giving them an obscuring effect.

This invisible coat allows the nanoparticles to travel long distances through the bloodstream to reach the tumor without being cleared from the body.

Second, this layer contains molecules that bind specifically to tumor cells.

Once bound, the cancer cells take up the nanoparticles, and the nanoparticles go inside the cancer cells, and now they're ready to fight.

yes! I feel the same way Let's do it!

(Applause) The siRNA worked first.

In a matter of hours, it suppresses and blocks survival genes in cancer cells.

We've now suppressed the special abilities of our genes.

What's left is cancer cells with no special defense system.

Then the anticancer drug emerges from the nucleus and deftly and effectively destroys the tumor cells.

With enough gene blockers, we can deal with many different types of mutations, giving us a chance to wipe out tumors without leaving any bad guys behind.

So how does our strategy work?

We tested these nanostructured particles in animals with a highly invasive form of triple-negative breast cancer.

This triple-negative breast cancer has a gene that causes the cells to spit it out as soon as the anticancer drugs arrive.

Usually doxorubicin, let's call it Dox, is the first line of treatment for breast cancer.

First, we treated the animals with dox nuclei, dox alone.

The tumor grew slower, but it was still growing rapidly, doubling in size in about two weeks.

Then we put our powerful weapons together and tried them out.

Using nano-layered particles containing siRNA, plus dox in the nucleus

Look, not only did the tumors stop growing, they actually shrunk in size, and in some cases were eliminated.

the tumor really disappeared

(Applause) The beauty of this approach is that it allows for individualization.

Many different layers of siRNA can be added to address different mutations and tumor defense mechanisms.

It's also possible to put different kinds of drugs into the core of the nanoparticle.

As doctors learn how to screen for cancer and understand the genotype of their tumors, they will learn more about which patients benefit from this strategy and which gene blockers are available.

I have a special feeling for ovarian cancer

This is a very aggressive cancer, partly because it's found at a very advanced stage, and when ovarian cancer is very advanced, it has a lot of genetic mutations.

After the first course of chemotherapy, ovarian cancer has a 75% chance of recurrence.

They usually have drug resistance when they relapse.

Aggressive ovarian cancer is one of the worst supervillains.

Now we face it with this powerful weapon.

As a researcher, I don't usually have much contact with patients.

I recently met a mother who is an ovarian cancer survivor. Her name is Mimi, and her daughter's name is Paige.

I was very impressed with the optimism and strength that both mother and daughter displayed, their stories of courage and support.

At this event, I talked about various technologies for treating cancer.

With tears in her eyes, Mimi shared how learning about these treatments gave her hope for future generations, including her daughter.

I was really touched by this

This research isn't just about building a higher science.

it's about changing people's lives

It's about understanding the power of engineering on the molecular scale.

It opens up new possibilities for students like Paige to advance their careers and tackle some of the world's biggest health problems, like ovarian cancer, neurological diseases, and infectious diseases, just as chemical engineering paved the way for me to use the smallest molecular scale methods to develop therapeutics on a human scale.

thank you

(applause)

It's my job and my responsibility as an astronomer to let people know that the extraterrestrial hypothesis is always a last resort in any case.

I will cite an example

It involves data from NASA missions, ordinary people, and the strangest stars in our galaxy.

NASA's Kepler mission began in 2009.

Its main scientific purpose is to search for planets outside our solar system.

This picture was taken toward a field of view in the sky, and each little square is a field of view.

Over the course of four years, we continuously observed the brightness of more than 150,000 stars in this one field of view, taking data every 30 minutes.

I wanted to look for a phenomenon called transit.

This means that the planet's orbit falls on the line of sight and the planet crosses in front of the star.

At this point, we slightly block the starlight, which is observed as a dip in this curve.

A team at NASA has developed a very powerful computer that looks for transits in all the data we get from Kepler.

As soon as the first data were released, Yale astronomers had an interesting question: what if the computer missed "something"?

So we launched a citizen science project called "Planet Hunters" to let the public see the data.

The human brain has an amazing ability to recognize patterns, sometimes surpassing computers.

But there were many who were skeptical about it.

Planet Hunters founder and colleague Debra Fischer says she's heard criticisms like, "You're stupid, and your computer can't miss the signs."

It was a classic human-computer bet.

How wonderful it would be if only humans found one planet.

When I joined the team four years ago, I had already found two.

So far, thanks to more than 300,000 science enthusiasts, we've discovered dozens of planets, including one of the most mysterious stars in our galaxy.

To help you understand this, let me show you some typical transit data observed by Kepler.

The vertical axis of this graph is the amount of light, and the horizontal axis is time.

The white line represents the light coming from the stars, and astronomers call it the light curve.

When a planet passes in front of a star, it blocks a little bit of light, but the amount of dip in this curve reflects the size of the object.

Let's take Jupiter as an example.

A planet can't be much bigger than Jupiter.

Jupiter's transit reduces the brightness of the Sun by 1%

Earth, on the other hand, is only about 1/11th the size of Jupiter, and it's almost impossible to tell the telltale signs from the data.

Now back to the mysterious star.

A few years ago, when Planet Hunters was analyzing data looking for transits, they found a strange signal coming from the star KIC 8462852.

Since it was first discovered in May 2009, it's been a topic of discussion in various forums.

It was said that an object like Jupiter may be dimming the starlight, but it's still a huge object.

A transit usually lasts only a few hours, but it lasted for nearly a week.

It was also pointed out that the curve is asymmetrical. In the case of Jupiter, it fades into a nice U shape.

What this suggested was that whatever was passing through and blocking the starlight wasn't spherical like a planet.

Several more dimmings were observed, but nothing happened over the next few years.

And in March of 2011, this happened.

The star's light intensity dropped by 15 percent, which is a huge change compared to the planet, which dims only about 1 percent.

This curve was recorded as smooth and crisp.

It's also asymmetrical, fading gradually over almost a week, then returning to normal in just a few days.

Again, nothing significant happened after that until February 2013.

And then something very strange starts to happen

A massive, complex-shaped dimming appeared on the light curve that lasted for 100 days until the end of the Kepler mission.

Dimming patterns took various forms

Some were sharp, some were wide, and they varied in duration.

Some lasted only a day or two, others lasted a week or more.

Sometimes the luminosity fluctuated even during the dimming, so it was as if several different events were overlapping.

At this time, the luminosity dropped by more than 20%.

This means that whatever blocks the light is over a thousand times the size of the Earth.

It's really remarkable

When citizen scientists observed this, they informed a team of scientists that they had discovered something very strange and worth keeping track of.

So a team of scientists looked at the data and thought, "Maybe it's a problem with the data."

But when I looked at the data very carefully, the data was normal.

There must be something astrophysical going on, which means that something is passing through space and blocking the light from the stars.

So I started looking at everything about this planet for clues as to what was going on at this time.

The citizen scientists who helped make this discovery joined the movement and got a first-hand view of scientific activity.

First, some people suggested that this star was so young that it was surrounded by clouds of matter that still formed the basis for star formation.

Others argued that planets had already formed in the star system and that two of them had collided, an event similar to the formation of the Earth-Moon.

Such hypotheses may explain some of the data, but there is no indication that the problem is a young star, nor is the light that would be emitted by being heated by starlight, which is what you would expect to see if the star were young or if the collision produced a lot of dust.

Another person said against the idea that a large swarm of comets with very flattened elliptical orbits would pass close to the star.

It can be matched to actual observational data.

That's true, but it feels a little forced.

Hundreds of comets must be assumed to match the observed data.

And only the comets that pass between us and the stars were counted.

There are actually thousands to tens of thousands of comets.

Still, it's the best out of all the bad hypotheses out there.

I decided to take this up and publish it.

And honestly, this was the most disturbing paper I've ever written.

Scientists tend to publish their results, but this is far from it.

So we decided to give it a catchy title, "What is the origin of light variation?"

I'll leave it to your imagination what the sign is

(Laughter) [WTF] It's not the end of the story.

As I was writing this paper, I met my research colleague, Jason Wright, who was also writing a paper on the Kepler data.

He said that with Kepler's extremely high accuracy, it would be possible to detect alien-built megastructures around stars, but they weren't.

So when I showed him this strange data that the citizen scientists had found, he said, "Tubby, what the fuck?

I have to rewrite my thesis."

We were intrigued because the explanation as a natural phenomenon wasn't good enough.

But first, we have to find a rationale that refutes the alien hypothesis.

Together, we convinced our fellow researchers involved in SETI, the Search for Extraterrestrial Intelligence, that this was a particular research goal worth exploring.

I wrote a proposal to observe this star using the world's largest radio telescope at the Green Bank Observatory.

A few months later, the proposal leaked to the media, and now there are thousands, maybe 10,000-plus articles written about this planet alone.

Do a google image search and you'll find this

"Tubby, are you wondering how aliens create this light curve?"

Imagine a civilization far more advanced than ours.

In this hypothetical situation, this civilization may have exhausted its planet's energy resources, so where will it get its energy from?

They have a home star, just like our sun, and if we could extract more energy from this star, we would solve our energy problem.

So we go out into space and build huge structures.

Let's call this gigantic structure, which looks like a giant solar panel, a Dyson sphere.

This image is an artist's rendering of a Dyson sphere.

It's a very difficult thing to paint in a way that you can imagine its enormity, but think of it this way.

The distance between the earth and the moon is about 400,000 kilometers

Even the simplest of these structures is about 100 times larger.

is huge

Imagine one of these structures orbiting a star

You'll find that it produces anomalous data that isn't flat and has an unnatural slope.

But even then, alien megastructures cannot defy the laws of physics.

If you expend a lot of energy, you'll generate heat, but it's not being observed.

But it could also just be that the radiation is directed in another direction instead of the Earth.

Another idea, which is my personal favorite, is that there's an interplanetary war going on, and we're just witnessing catastrophic planetary destruction.

And let's be honest, in this case you're going to produce a lot of dust, which we haven't observed.

But since it's a hypothetical story about aliens, you could say that this garbage was efficiently collected for recycling.

(Laughter) And when you think about it, it's more and more imaginative.

well that's about it

So far, it's either a natural phenomenon that we don't know about, or an alien technology that we don't understand.

Personally, as a scientist, I bet on natural phenomena.

But don't get me wrong, it would be great if we could find aliens.

Anyway, if you can find it, it's something new and very interesting.

What next?

We need to continue observing this star to learn more about what's going on.

But professional astronomers like me have limited human resources to do this kind of research, and besides -- Kepler has other missions.

So, I'll say it again, and I'm glad that the citizen scientist has joined us again -- and helped us out of this predicament.

Now, more and more amateur astronomers with telescopes in their backyards have joined us, and they've started observing the stars nightly with their equipment, and I'd love to see what they find.

What impressed me was that this star was never discovered by computer, because we weren't looking for a phenomenon like this.

Excitingly, more data is coming in.

There's also a new mission that's about to start, to observe millions of stars across the sky.

What would it mean if we found another star like this?

On the other hand, what does that mean if you can't find it at all?

thank you very much

(applause)

Let's say you get a message from a friend that says, "Something impossible happened.

Seriously kidding! ”

As a friend, if you ask me more about it, I'll start talking about the gym, work, and the date the night before.

You listen and try to understand the reason for your anger.

You may secretly wonder if you should be so angry

(Laughter) I might try to advise.

This is what I do every day, because my job is to study anger. Professionally, I spend a lot of time at work -- and in my private life -- (Laughter) I study why people get angry.

What do people think and do when they're angry?

(Laughter) Again, as you can imagine, when people learn about my work, they want to talk about their own anger and anger.

It's not because you need a therapist, which is sometimes the case, but because anger is universal.

Everyone can feel it, everyone can understand it

It's a feeling you already had when you were a few months old. You would have cried and complained that your needs weren't being met, "Dad, what are you doing if you won't take my rattle?

Give it to me! ”

(Laughter) The anger continues into my teenage years, and in my case, my mother is a witness.

sorry mom

And I feel it until the very end

In fact, anger can occur during the most difficult times in our lives, and it's a natural and understandable part of grief and grief.

And it happens even in the best moments of our lives. Even special milestones like weddings and vacations can be ruined by mundane grievances. Bad weather and transportation delays can be really frustrating moments, but once you get the hang of them, they're unforgettable.

I talk a lot about anger with a lot of different people, and what I've come to realize through those conversations is that a lot of people -- and I'm sure everyone in this room does -- see anger as a problem.

Maybe it's because I'm even afraid that my life will be swayed or my relationships will be destroyed.

I know how you feel, but my perspective is a little different, and today I want to share with you something very important about anger: it's a healthy force and a powerful ally in life.

Feeling angry is good and necessary.

To understand all of this, I have to go back a little and talk about why people get angry in the first place.

It's largely based on a 1996 book by an anger researcher named Dr. Jerry Diffenbacker about coping with nasty types of anger.

For most people, and for all of you, the mechanics of anger are pretty simple: when you're provoked, you get angry.

"Slow driving like this really annoys me."

"He kept the milk out again. It's pissing me off."

Ultimately, "I'm not troubled by anger. I just want people around me not to offend me."

(Laughter) To get a better understanding of this kind of stimulation, I asked a lot of people, friends, colleagues, even family members, "What makes you tick? What makes you angry?"

By the way, one of the things I think I've gained from doing this job is that it took me over a decade to come up with a complete list of ways to pry your co-workers upside down.

someday it will be useful

(Laughter) Anyway, I got some very interesting answers: "When your sports team loses."

By the way, this is an incredibly common answer.

(Laughter) "Someone who walks too slowly." I agree with you.

And you can't miss the "roundabout"

(Laughter) No joke, there's nothing more frustrating than a roundabout.

(Laughter) I can't say I don't care.

Some people say they're outraged by global problems facing all of humanity, such as racism, sexism, bullying, and environmental destruction.

But sometimes there are very special, even rare, answers

"When your shirt gets wet in a straight line, when you accidentally lean against the washbasin in a public restroom."

(Laughs) It sure feels bad.

"It's a USB memory. There are only two ways to insert it, but for some reason it can only be inserted the third time."

(Laughter) Whether it's big or small, whether it's for general reasons or specific reasons, when you look at these examples side by side, you can find common ground.

People get angry in situations that make them feel uncomfortable or unfair Situations that prevent them from achieving their goals Situations that could have been avoided Situations that make them feel helpless

All of these things are sources of anger, but anger isn't the only emotion you feel.

Anger Doesn't Happen Alone

When we feel anger, it can be accompanied by a variety of other emotions, such as fear and sadness.

But what is anger?

At least it's not caused by the stimulus alone.

Of course, otherwise everyone would have to be pissed off for the same reason.

If you and I have different reasons for being angry, there must be something else.

what it is

What the person is doing and feeling at the moment of stimulation is said to have an effect.

"Before you get angry", you're hungry, you're tired

I'm worried about something, or I'm about to be late

In such a state, the stimulus is strongly felt to that extent.

But the key is neither the stimulus itself nor the pre-anger phase, but how we interpret the stimulus, how we perceive it in our context.

When something happens to us, we first make decisions: good or bad, fair or unfair, condemnable or punishable.

This is "primary appraisal." It assesses the event itself.

You decide what it means in your situation, and then decide how bad it is.

This is the "secondary evaluation"

It's a judgment call, "Is this the worst thing I've ever done in my life, or is it something I can live with?"

For example, imagine you're driving somewhere

First of all, if I want to set up a situation that will piss you off because I'm a genius at doing bad things, I'll almost certainly choose to do it while I'm driving.

(Laughter) I'm not kidding, because you're going somewhere, and the traffic jams, the other cars, the roadwork, whatever you come across along the way can make you feel like you're not getting there.

Even legal traffic rules and unspoken rules are being broken in front of us on a daily basis. Usually, nothing happens.

is breaking the rules

Anonymous someone you'll never meet again. Perfect to point your anger at.

(Laughter) Anyway, you're driving, so be prepared to get mad, and the car in front of you is going way slower than the legal speed limit.

It's frustrating because I have no way of knowing why you're sluggish.

This is the "primary evaluation"

I look at the situation and decide that it's "horrible and worthy of condemnation."

But then he said, "I'm not in a hurry and I don't care."

You may judge that this is a "secondary evaluation"

I'm not angry

But let's say this was on the way to a job interview.

what is happening is the same

The result of the primary evaluation remains the same.

But you're definitely not in your own headroom, because you're going to be late for your interview this time around.

In a complete turn, my ideal job is getting farther away.

(Laughter) Someone took my dream job, and I'm broke.

a life of poverty awaits

Should I just give up and turn back? Should I go back to my parents' house?

(laughs) It's all because of the person in front of me.

No, it's not a human, it's a demon

(Laughter) A demon who came just to ruin my life.

(Laughter) Now, this train of thought is called catastrophic thinking, and it's about seeing things in the worst possible way.

This is the type of thinking that is most common in people with chronic anger.

There are many other

"Misunderstanding of Causality"

Angry people tend to shift their motives to irrelevant things, and they don't just blame people, they can also blame things.

If you think you're stupid, when you can't find your car keys, you probably said, "Where did the keys go?"

The key is something that escapes on its own.

(Laughter) I also tend to overgeneralize.

"I always get this way" "I never get what I want"

"On the way here, the traffic light was red."

There is also "selfishness" that puts one's own desires before others.

"Do you know why he's driving slowly?

Either speed up or get out of the way so I can make it to the interview."

The end is "labeling that stirs anger"

Others are called idiots, idiots, demons, etc. Sometimes words that shouldn't be said in this place pop out across the board

(Laughter) For a long time, psychologists have called these kinds of thoughts "cognitive distortions," "irrational beliefs," and so on.

well most of the time

But sometimes there's justified anger, too.

There is injustice in the world

There are people who are cruel and selfish, and when they're treated badly, it's not only right to be angry, but it's right to be angry.

If there's one thing I want you to remember from today's talk, it's that the emotion of anger is endowed with us because it gave our ancestors an evolutionary advantage, both before and after they became humans.

Just as fear signals danger, anger signals the existence of injustice.

It's a message from your brain that it can't take it any longer.

Anger can also be the driving force behind the injustice.

Remember the last time you got angry

Your heart rate increased, your breathing became rougher, and you began to sweat.

This is the action of the sympathetic nervous system, also known as the "fight or flight instinct," which activates the ability to respond.

These are conscious reactions

At the same time, digestion slows down to conserve energy.

That's why my mouth is dry

The blood vessels also widen to send blood to all the limbs.

That's why my face turns red

They're all part of the complex physiological response inherited by modern humans that helped our ancestors to face the harsh forces of nature.

The problem is that the physical battles that our ancestors used to manage their anger are neither rational nor appropriate today.

I can't swing my golf club around every time I lose my temper.

(Laughter) But there are also good things.

You have an ability that your prehuman ancestors didn't have: the ability to control your emotions.

When you're tempted to get involved, you can hold yourself back and channel your anger into something else and more productive.

When people talk about anger, they tend to talk about how to avoid getting angry.

Calm down, relax, don't worry, etc.

They all assume that anger is bad and that feeling angry is bad.

I would rather think of anger as motivation.

Just as when you're thirsty, you want a glass of water, and when you're hungry, you want a bite, anger can motivate you to deal with injustices.

You don't have to think about what to get angry about

Going back to the beginning, yes, there are some silly things that aren't worth getting angry about, but racism, sexism, bullying, and environmental destruction are real and unacceptable.

When you fight, you don't need aggression, hostility, or violence.

There are endless ways to express anger

protest, write letters to the editorial staff, donate or volunteer to social causes.

You can create art and literature, you can write poetry and music

Another way is to create a community of compassion for each other and not tolerate outrageous behavior.

The next time anger flares up, instead of trying to suppress it, focus on what your anger is teaching you and focus on something positive and productive.

thank you

(applause)

There are people who return to work after a hiatus, and I call them "re-employers."

The reason for the discontinuation may be for caregiving, child rearing, pursuit of interests, or personal health issues.

Close to this are people undergoing various career changes, such as veterans, military spouses, retirees returning to work, and returnees from living abroad.

Returning to work after a break is difficult because of the disconnect between employers and re-employers.

Employers perceive gaps in rehiring resumes to be riskier. Those who seek re-employment after a break are also more likely to question their own abilities, especially if the break is long.

This disconnect problem is what I want to help.

Successful re-employers are everywhere, in every industry.

Pictured is Sami Kafala

He's a nuclear physicist in England, and he took a five-year hiatus to spend time with his five children.

A Singaporean newspaper recently featured a nurse returning to work after a long hiatus.

Speaking of people who took a long hiatus, it's Mimi Khan.

I'm a social worker in Orange County, California.

It's the longest hiatus I've ever known.

Supreme Court Justice Sandra Day O'Connor took a five-year hiatus early in her career.

She's Tracy Shapiro, hiatus was 13 years.

Tracy submitted an essay for The Today Show, a call for essays by people struggling to return to work.

She wrote that she was a mother of five who loved her time at home, that she needed to work again because of her divorce, and more than that, she wanted her work life back.

Tracy started looking for a job on a day when she could focus like you do.

What Tracy was looking for was a job in finance or accounting, and she kept looking for it for nine months.

I met Tracy in June of 2011, when The Today Show asked if I could help her get better.

The first thing I said was, "Go outside."

I want you to be more open about your job search and let people know you're interested in re-entering the workforce.

I also told him that it doesn't matter if the results don't come to fruition, so keep talking to people.

Don't get discouraged by expecting things to go wrong

Because there should be even a small chance of getting a job

I'll tell you what happened to Tracy later, but before I do, I want to tell you what I discovered when I quit my full-time job and came back after 11 years.

It means that the perception of yourself as seen by others remains the same as it was in the past.

What I'm trying to say is that when you start contacting old acquaintances again, whether it's an old work colleague or a classmate from school, what they'll remember is who they were before they left.

Even if you feel like you're devaluing yourself over time, as many of us have experienced, the longer the hiatus, the less we feel as professionals.

You may see yourself like this

I'm frustrated after driving my minivan all day.

this is me in the kitchen

But my old acquaintances don't know me like this.

They remember their old selves, and their rejoicing in keeping in touch with old acquaintances and their willingness to return restores their confidence.

There's one more thing I remember vividly about my hiatus.

I barely followed business news.

My major was finance, but when I was home caring for four small children, I barely followed the news.

So I was afraid that I would go to an interview and start talking about a company that no longer existed.

I started subscribing to The Wall Street Journal again, and after six months of reading it from cover to cover every day, I was back in touch with the business world.

I think re-employed people are like gems in the workforce. Let me explain why.

Think about the stages of life: Those who have taken a break from parenting are less likely to take maternity leave in the future.

I have already taken

Almost no relocation of spouse or partner

in a more stable period of life

Work experience is impeccable

have a more mature mindset

I don't try to find myself at my employer's expense

Additionally, we have the energy and enthusiasm to re-enter the workforce, precisely because we've been away from work for some time.

On the other hand, when I asked employers, there were two concerns about hiring rehired workers.

The first is whether the skills of re-employed workers are outdated.

As someone who was technically obsolete at one point, I can tell you that it's only temporary.

Back when I was doing financial analysis, I used to have a Lotus 1-2-3.

I don't know if anyone remembers those days, but I used Excel to relearn financial analysis.

It wasn't that hard Many of the commands were the same

PowerPoint used to be more difficult, but now I use PowerPoint a lot.

Employers tell re-employees that they expect them to be able to use at least basic office software.

If you don't have the skills you expect, it's up to you to develop those skills.

of course it is possible

The second concern employers have with rehired workers is that they don't know what they want to do.

I tell re-employees to take a hard look at whether their interests and skills have changed during the break.

it's not the employer's job

It is the re-employer's responsibility to show their employer where they can demonstrate their worth.

Something I started noticing in 2010

I've been following outplacement programs since 2008, but in 2010, I began to notice cases where internships, short-term paid jobs, whether they're called internships or not, are being used as a way for ex-workers to get out.

Companies like Goldman Sachs and Sara Lee have launched outplacement internship programs.

There was an engineer who went back to work, but was an unconventional re-employment candidate, applied to the military's recruiting internship program, and then got hired.

And two universities have incorporated internship programs into their managerial education programs for experienced workers.

I wrote a report about all of this, and it was featured in the Harvard Business Review, and it was called "The 40-Year-Old Intern."

I want to thank the editor for the title and the illustration, which is a picture of a 40-year-old intern among student interns.

And thanks to FOX Business News for introducing me as a 50-year-old intern.

(Laughter) Five of the biggest financial companies have introduced out-of-work internships for people with financial experience returning to work.

Hundreds of people are currently participating

These internships are paid, and those who become permanent hires earn very attractive salaries.

In addition, the seven largest companies in the engineering industry are trialing an internship program for re-employed engineers at the initiative of the Women's Engineers Association.

Why are companies hiring re-employment internships?

The reason is that if you do an internship, the employer will be able to make a hiring decision based on your performance.There is no need for multiple interviews, and the employer will not have to make a permanent employment decision until the internship period is over.

A probationary period removes the risk associated with hiring rehiring workers, and internships can attract the best candidates who turn into good people.

we were able to come this far

Until now, many employers have had no interest in hiring rehired workers.

But now, not only are programs geared toward re-employed workers developing, but those programs require a blank space on your resume to apply.

And that's the epitome of real change that really shows that the system has evolved. If we can solve this problem for re-entering the workforce, we can also solve it for other career changes.

In fact, an employer recently told me that his company's veteran return-to-work program is based on the Outplacement Internship Program.

And there's no reason why internships for retirees shouldn't exist.

The subject is different, but the concept is the same

Now let's talk about Tracy Shapiro.

Remember, she had to tell everyone she knew that she was interested in re-entering the workforce.

Thanks to a conversation with another parent in her community, Tracy got a job offer, albeit an accountant in the finance department.

it was a temporary job

The company told me that this temporary job could be a better paying job, but they couldn't guarantee it.

It was the fall of 2011

She loved not only the company, but the people who worked there, and the office was within 10 minutes of her home.

She had a second offer from another company, a full-time job, but she chose an internship at the first company and hoped it would go well.

She went above and beyond the company's expectations, and in early 2012, the company not only offered her full-time employment, but made the job description even more interesting and challenging because she knew Tracy could do it.

Fast forward to 2015, Tracy got promoted.

The company paid for the evening MBA course

She hired a rehired employee as her subordinate.

My first temporary job was a test, much like an internship, and it was the right choice for both Tracy and my employer.

My goal is to introduce the concept of outplacement internships to more employers.

But in the meantime, if you want to get back to work after a hiatus, don't be afraid to offer an internship or similar arrangement if your employer doesn't have a reemployment internship program.

Be the first success story and set an example for future re-employers

thank you for listening

(applause)

The problem with writing and working and watching the Internet is that it's very difficult to discern fashion and deep change.

In doing so, I would like to go back to 1835.

1835 James Gordon Bennett publishes the first popular newspaper in New York

You need $500 to get started, which is equivalent to $10,000 today.

Fifteen years later, in 1850, it would have cost $2.5 million to do the same thing -- to start mass-circulating a daily newspaper.

10,000, 2.5 million, 15 years

This is the crucial change that is being turned upside down by the net.

I'm going to talk to you today about that and how it relates to the emergence of social products.

What we see from the newspaper example is the high cost of initial investment in information, knowledge, and culture, thereby creating a wide disparity between the producers who can raise capital -- like any other industrial organization -- and the passive consumers who can choose from the set that this industrial model produces.

Now, terms like "information society" and "information economy" have long been used to describe what happened after the Industrial Revolution, but the truth is, to understand what's happening today, this is a mistake, because for 150 years, the information economy has existed.

It's an industry, and the producers of the information had to raise $2.5 million and then more to pay for the telegraph, the radio, then the television, and finally the mainframe.

Whether it was market-funded or government-funded was determined by the position of the organization, and this marked the way information and knowledge were produced over the next 150 years.

Now let's take a different example. Around 2002, something happened in the world of supercomputers.

The Japanese built the first fastest supercomputer -- the NEC Earth Simulator -- and stole the lead from America, and two years later -- this shows how many trillions of floating-point calculations a second a computer can do.

All of this completely ignores that there are other supercomputers in the world during this period -- SETI@Home

-- 4.5 million users around the world contributed their spare power while they were not using their computers to run screensaver programs and shared resources to create a gigantic supercomputer that NASA used to analyze data coming from radio telescopes.

This picture shows a fundamental shift in how the production and exchange of information is funded. Not that it's costless, but that the ownership of capital, the fundraising, has been radically decentralized.

These are basically no different than the routers at the heart of the network

And the computing power, the storage, and the ability to communicate is virtually in the hands of connected people -- and this is the capital needed to create physical information, knowledge, and culture, and it's in the hands of the 600 million to 1 billion humans on this planet.

This means that, for the first time since the Industrial Revolution, the most important tools, the most important parts of the most advanced economy -- remember, we're in the information economy -- are in the hands of the most people. This is very different from what we've seen since the Industrial Revolution. It looks like it's -- it's not like it's replaceable

When someone tries to do someone else's job, or hand it over to someone else, no matter how detailed the manual is, it can't convey your knowledge or your intuition under certain conditions.

We are unique in that sense, and each of us is an important input in this system.

what does it affect? The story most people know is about free or open source software.

This is the Apache web server market, one of the must-have applications for web communication.

In 1995, two groups of people said, "Wow, this is really important, the web! We need better web servers!"

One group is a motley bunch of volunteers, this is what we really need, we have to make it, so how do we do it, yes, let's all share it! so other people can develop

the other was microsoft

Now, wouldn't it be great if the motley people who had no control over what they produced were going to have 20 percent of the market in 10 years, as shown by the red line?

Think of it as a minivan, like a group of auto mechanics spending the weekend competing with Toyotas.

But in reality, of course, that's 70 percent, and 70 percent of the critical web applications that run communications and applications on the web, including major e-commerce sites, are competing with Microsoft, not as a trivial matter, but as an important strategy to acquire the building blocks of the net.

The software has shown this in a very understandable way, because it's measurable.

So, instead of having three or four well-trained Ph.D.s doing the work, they broke the problem into small pieces and put it up on the web so people could do it five minutes here, ten minutes there, with a very simple interface. So much so that it is practically indistinguishable from a PhD.”

Now, when you have a little daughter, and you're trying to write something -- she's not that young, and she's already figured it out -- she's going to do some research on Barbie.

She'll look at "Encarta," one of the leading online dictionaries.

Here's what it says about Barbie. It doesn't say anything more than a definition: "manufacturers." No -- but it's not much different from Encyclopædia Britannica, just the way it's written, about body image arguments, commercialism, and claims that she's a good role model.

Besides the content, there is also how the relevance was created

Yahoo!'s reputation was that it hired people to watch -- it doesn't anymore -- it hires people to look at websites and write about it -- that if it's indexed, it's good. It's the antithesis of a paid employee. Nobody owns it, and the product.

This isn't just happening outside of business. When you think about Google's critical innovation, critical innovation is outsourcing the most important thing -- determining what's relevant -- to communities across the web, letting them do what they want. That's PageRank.

The critical innovation is that instead of leaving it up to our engineers or whatever to figure out what's most important, people out there on the web, for whatever reason -- vanity, joy, whatever -- create links and count the numbers that connect them.

And then there's Barbie.com, but at the same time, Adiosbarbie.com, body image of all sizes is also a subject of cultural controversy, and they're not going to show up in Overture with traditional market-based mechanisms, people who pay more get on the list.

It's all about creating content, relationships and expressions

But computers are physical, physical objects -- we share computers, and wireless is the same thing.

In the past, individuals owned radio licenses, and when a signal was transmitted at a location, they had to decide whether it was owned or licensed.

These days, computers and wireless communications have become so sophisticated that algorithms have been developed that allow people to own a device, such as a WiFi device, and create their own broadband network using a shared protocol layered on top of it, with simple rules: When I'm idle or not in use, I bridge your messages, so when you're not in use, please bridge.

This is not a fixed version yet, and a working model is being tested in at least a few locations in the United States, at least for public safety.

Let's say this in 1999, try to create a data storage and data retrieval system.

It has terabytes of storage, is always available, and can be accessed from anywhere in the world.

It can support over 100 million users at any given time, and can withstand attacks such as deleting indexes, embedding malicious files, and occupying key nodes. It takes a tremendous amount of time.

You'd say it would cost a ton of money, but of course it's a P2P file exchange.

don't you We always think of music downloads, but at its core, this is a decentralized storage and retrieval system that allows people to share their bandwidth and storage for some very obvious reason to create something.

And essentially what we're witnessing is the emergence of a fourth framework. In the past, there were two axes to carve things out: market-based or non-market-based; decentralized or centralized.

The Price System is a market-based distributed system

If it seems that having someone in control makes things more efficient, then in the market there are companies -- in the non-market there are governments and sometimes large non-profit organizations.

Decentralized social products were too expensive, and having decentralized behavior in society -- it's not about society.

it was a financial problem

But what we're witnessing now is the emergence of a fourth system of social sharing and exchange.

It's not that we as social creatures do good to each other for the first time, we do that all the time.

It's the first time it's had an economic impact.

It is characterized by decentralized authority

No need to ask for permission like you would on your own system

can i do this? It's open to anyone who wants to create, innovate, and share it with themselves or with others, because ownership is one of coordinating functions.

But that's not all

Instead, what we're looking at is a social framework for things that matter, using market ownership and contracts, information flow to know what the interesting issues are, who's possible and suitable, motivational constructs -- money isn't always the best motivation.

Leaving a $50 check after dinner with a friend doesn't increase your chances of being invited back.

If food is confusing, think sex. (Laughter) It also requires some new organizational approach.

In particular, what we saw was the organization of work

you have to hire people who know their job

you have to get the people you hire to spend a lot of time

Now, if we break the same problem down into smaller modules, the motivation doesn't matter.

Five minutes instead of watching TV?

It looks interesting, so let's do it for five minutes, it's fun

You can have a social relationship because it seems like something meaningful or something like Wikipedia with more complex relationships

So a new social phenomenon is happening

Competition is created, among which new forms of competition are visible

P2P networks are assaulting the music industry; free and open source software is taking market share from Microsoft; Skype is potentially threatening traditional phone companies; Wikipedia is competing with online dictionaries

But it is also a source of new business opportunities.

As new social relationships and behaviors emerge, so do new opportunities, such as the creation of tools.

Instead of building well-behaved applications that know what they're going to do in advance, build tools that are more open. There are new values, new things that people value.

Create a platform for self-expression and collaboration

If you're building a platform like the Open Directory Project, like Wikipedia, you could look at it as a model.

And then there are the surfers, who are eyewitnesses to these things, and they're spreading these into the consumer network, which is interesting.

You could say it's a belief: new things are born out of networked people.

If something is offered to me that I can use, I use it as a tool

And give something to others, which is terrible -- that's basically what Google does.

That's what IBM does with software services, and they're doing pretty well.

Social Products Are Real, Not Booms

It's a long change initiated by the internet.

Social relationships and exchanges are more important than ever as an economic phenomenon.In some contexts, they're even more efficient.Because of the amount of information available,the ability to find the best talent,and low transaction costs.It's sustainable and growing rapidly.

But -- and this is the dark side -- it's threatened -- as much as it threatens itself -- by the traditional industrial system.

The next time you open a newspaper and read about an intellectual property decision or a phone company decision, it's not a small, technical thing.

It's about how information, knowledge and culture are produced, as it relates to whether we can become social beings together in the future.

What we're seeing right now is whether the industrial information economy is going to continue in some form or another, or new models of production will evolve alongside existing industries, changing the way we see the world and communicate what we see.

thank you

There are two reasons why companies go bankrupt: they either keep doing what they've always done, or they try too many new things.

The true way to create sustained growth is to balance two pillars of corporate strategy: Exploration and Exploitation.

You need both elements, but sometimes too much emphasis on one or the other can backfire.

For example, a company called Facit

I'm old enough to remember Fasit

Facit was a great company

Born deep in the woods of Sweden, in its heyday it made some of the best mechanical calculators in the world.

there was a tremendous prevalence

But when the computer came along, Facit made a mistake.

I kept doing what I used to do.

Only 6 months after hitting record high profit

bankruptcy

i lost it all

The irony of Facit's failures can also be seen in the actions of Facit's engineers.It is said that they used small, cheap calculators made in Japan to check the accuracy of their calculators.

(Laughter) Facit relied too much on deepening existing technology.

But exploration also has its pitfalls.

A few years ago, I worked on strategy for a European biotechnology company.

Let's call it "Oncosearch"

was an excellent company

It had a number of potential applications, not just for diagnosis, but even for the treatment of certain types of leukemia.

always pursue evolution

It was an innovative company. The company's philosophy was ``After solving everything'' or ``Seeking perfection''.

Unfortunately, far from being perfect, this company fell out of fashion before it even got to the point of doing it.

Oncosearch died because it explored too much.

I first heard about the ambivalent management theory of exploration and deepening about 15 years ago, when I was a visiting fellow at Stanford University.

A man named Jim March put forward this theory.

The main attraction of this idea is its practicality.

to explore

always looking for new things

Seeking Discovering Creating new products Seeking innovation

Pioneering unexplored fields

The people who accomplished these quests are our heroes: the scientist Madame Curie, the painter Picasso, the astronaut Neil Armstrong, the mountaineer Sir Edmund Hillary.

I'm from Norway, and all the heroes in my country are adventurers, and I admire them for what they do.

Adventures naturally come with risks.

I don't know the answer, I don't know if I will find it, the risk is very high.

Deepening is the opposite concept

Refinement is the use of already acquired knowledge and the further refinement of it.

To create a system that allows trains to run on time

Manufacture high-quality products quickly and cheaply

Low risk of deepening and safe in the short term

But relying too much on deepening alone is risky in the long run.

When you think of pop groups that were once in vogue, you probably think of them.

This is the risk of relying too much on deepening.

Then, in the long-term perspective, search for

Focus on deepening in the short term

small children are always exploring

Immerse yourself in a day of exploration

As we age, we gain more knowledge and we can deepen this, so we stop exploring.

companies are the same

When a company reaches maturity, evolution inevitably slows down.

This is the real problem for business owners.

This worry comes in the form of a variety of questions.

For example, is it possible to innovate while running a solid company?

Or how should a company's technology evolve before it becomes obsolete, before it faces a crisis?

Even doing one thing well can be difficult

Moreover, pursuing both exploration and deepening at the same time is quite a divine skill.

What we found in our survey was that only about 2% of companies were able to practice both exploration and deepening in parallel.

But if you can do it, your odds of success go up enormously.

There are many examples to support this fact.

Nestle, a food company that introduced "Nespresso," Lego, a toy company that made a foray into animated films, Toyota, which achieved success with hybrid cars, and Unilever, which launched a sustainable strategy.

So why is it so difficult to keep the balance?

It's because there are so many pitfalls that you can't get out of.

Here are two examples out of many

Let's first consider the pitfalls of constant seeking.

It's good to discover something new, but it lacks patience and perseverance to thoroughly pursue that discovery and put it into practical use.

Without pursuing it, I run to new things again

And then you do the same thing over and over again, and you get stuck in a vicious cycle where new ideas come to you and you quickly get frustrated.

The failure of Oncosearch is a classic example.

Xerox also falls into this category with a famous failure.

Of course, such failures are not limited to the private sector.

It's happening in the public sector too.

For example, efficient reforms of the education system, research, health care, and defense will take 10, 15, 20 years to take effect.

But in reality, it changes more often, so

Not given the opportunity to succeed

Success is also one of the pitfalls

Facit fell into the trap of success.

I had the potential to take the leap, but I went blind.

I was so obsessed with making things that I love so much that I didn't want change.

we humans are the same

It's hard to change when you're good at one thing.

Bill Gates said, "Success is the worst teacher."

Successful experiences make us think that we will not fail.

This is the challenge that comes with success

Learning from examples like this is a lesson for us.

And it's also a lesson for our company.

The first is to anticipate crises.

Companies that can innovate have insurance for the future

A company called Netflix was very successful in traditional content distribution, but nevertheless, it will change form, and perhaps it will continue to evolve and venture into new areas.

In my experience, many companies keep saying the same thing: "No matter what, we'll conquer the next innovation cycle."

The second is to “develop a strategy based on multiple periods”.

Look at the chart, I think it's very clear.

If you take any company for example, and you rate it on the basis of a year, it's only about 30 percent innovation.

So innovation isn't that important over the course of a year.

But if you measure the same company over 10 years, you'll see 70% innovation and evolving know-how.

The problem is that companies cannot choose one or the other.

We also need to invest for the long term, for the long journey.

The third lesson is "discovering talent"

No one, no matter how brilliant, can strike the balance between exploration and deepening alone.

Think of corporate management as a team sport

It is necessary to promote a spirit of challenge within the company

The mark of a great company is that it affords adventure, and the mark of a good management team is that it fosters constructive adventure.

Think of it as the same theory that raises a child with a deep bosom.

Finally, “Don’t forget to doubt your success.”

Think of the Roman victory marches, where generals were honored with marches after great battle victories.

Riding in a carriage marching through Rome, I was always accompanied by an assistant who whispered in my ear, "Don't forget, you're just a human."

I hope this convinces you that the ambidextrous balance of exploration and deepening has tremendous benefits.

Of course, it's difficult, and you need to be constantly aware.

Please answer two practical questions here.

The first question is to evaluate your company, in which areas do you feel most at risk, and in which areas do you fall into the pitfalls of success and rely on self-driving cars?

What can be done to avoid it?

Second, when was the last time you tried something new, and how did that experience affect you?

Should we experience such experiences more often?

I myself answer "yes"

Lastly, don't forget this lesson.

Remember, whether you're an adventurer by nature or someone who develops existing abilities, it's the balance of these two factors that determines the outcome.

thank you

(applause)

There aren't many places on earth that are good for humans to live in, but we've survived.

When their livelihoods and homes were threatened, our ancient ancestors rushed into unfamiliar lands in search of better settlements.

As descendants of these adventurers, we have a love of travel in our blood.

But at the same time, he seems to have lost his appetite for adventure, caught up in the trivialities of life, caught up in human conflicts.

We human beings have adapted to the earth's environment, adapted to the earth, and evolved independently with the earth. And we were satisfied with the adaptation to the living environment - too sufficient, too busy, forgetting that the earth's resources are finite and life on the sun is finite.

Mars, and every movie that bears its name, has breathed new life into the ethos of space travel. What many of us don't realize is that the fragile fabric of humanity is utterly unprepared for the long journey into space.

To capture reality, let's say you visit a nearby national park.

Who of you thinks you can survive a few days in this lush natural environment?

Many people seem to think they can

How about a few weeks?

there are quite a few

How about a few months?

there are still many

Now let's assume that this national park has entered an endless winter.

Same question. Do you think you can survive a few days?

many hands up

How about a few weeks?

So this time, the only potable water is deep ice chunks, well above the surface.

What if the soil is barren, the plants are nowhere to be seen, not to mention almost no oxygen?

Examples like this are just a few of the many challenges we face on planets like Mars.

So what does it take to prepare for a trip to a destination far removed from your everlasting summer vacation?

Will we continue to carry resources from Earth forever?

Build a space elevator or a long, long transport belt to connect your chosen planet to your home planet?

How do you grow food that grows on the planet like we do?

I need an explanation first.

Humanity's journey to find new habitats under a new sun is almost certainly going to take us a long time to travel, in outer space, "sealed flying cans," in spacecraft, probably for generations.

So far, the longest human stay in outer space has been around 12 to 14 months.

Astronauts' experiences in space show that spending time in microgravity causes bone loss, muscle atrophy, cardiovascular problems, and many other physical and mental problems.

Under the influence of macrogravity - under the influence of the gravitational pull of the planets we reach?

In short, our space travel will involve known and unknown dangers.

Until now, we've looked to new mechanical technology and the next generation of superior robots to be part of the preparations for human survival in space.

And as wonderful as these are, I think it's time to complement these big electronic devices with the power of microbes that nature has already created: asexually reproducing, self-replicating single-celled organisms, living machines.

It requires very little maintenance, has a more flexible design, and can be transported in a plastic test tube.

This field of research, which explores the possibilities of using microbial resources, is called synthetic biology.

Derived from molecular biology, which gave birth to antibiotics and vaccines, molecular biology is also a method for observing more precisely the subtle aspects of human bodily functions.

Using synthetic biology techniques, we are now able to edit the genes of virtually any organism, microbial or otherwise, with amazing speed and fidelity.

Compared to the limitations of human-made machines, synthetic biology will allow us to not only "edit" our food, but also our fuel, our environment, and eventually ourselves, in a way that compensates for the limitations of our bodies, enabling us to survive in space.

As an analogy of how synthetic biology can be used for space exploration, let's imagine Mars.

Soils on Mars are similar to Hawaiian volcanic ash, with trace amounts of organic matter.

Let's say, what if the soil on Mars could grow plants without terrestrial nutrients?

The first question that comes to mind is how do we make plants freeze tolerant?

Because the average temperature on Mars is a chilling -60 degrees Celsius.

The next question to consider is that most of the moisture turns into frost.

In an environment that evaporates before I can even finish saying "johatsu," how do you make plants drought tolerant? about it

In fact, we are already dealing with this kind of problem.

By borrowing genes that make antifreeze proteins from fish, drought-tolerant genes from plants like rice, and introducing them into plants that need them, we've created plants that survive most droughts and freezes.

They're known on this planet as GMOs, or "genetically modified crops," and we rely on them to feed humanity.

Nature already does this kind of thing without human intervention.

We just found a more precise method than that.

So why change the genetic makeup of plants for space?

Otherwise, we'd have to build huge glass domes to vent vast amounts of atmosphere to contain it, on a completely unknown planet, on an endless stretch of land.

This highly impractical construction project would involve a high-cost cargo space transportation project.

One of the best ways to secure food and air resources is to bring along organisms that have been modified to withstand the harsh new environment.

So we're using modified organisms to terrestrialize the planet, short-term and long-term.

These organisms can be modified to produce medicines and even fuels.

We can bring plants that have been enhanced using synthetic biology. What else can we do?

As I touched on earlier, humans have evolved to specialize in the global environment.

That fact hasn't changed in the five minutes that you and I have been here.

If someone were left stranded on Mars right now, even with enough food, water, air and spacesuits, on a planet like Mars with little atmosphere, the ionizing radiation that rains down on the surface would cause some nasty health problems.

Unless you're going to dig a hole in the ground and live underground for as long as you're on the planet, you'll have to find a way to protect your body without having to wear protective clothing that's as heavy as your body weight, or hiding behind a lead wall.

Let's look to nature for inspiration.

Among the vast array of life on Earth, there are organisms called extremophiles, microbes that thrive under extreme conditions, and you may have learned about them in high school biology class.

An extremophile microorganism called Deinococcus radiodurans

Can withstand cold, dryness, vacuum, acid and radiation

Its radiation resistance function is well known, but it has not yet been adapted to mammals.

this is not easily achieved

Radiation resistance is driven by a variety of principles, and it's not as simple as introducing a single gene.

I think that with human wisdom and a little bit of time, it's not that difficult to achieve.

If we could borrow even a little bit of that ability to withstand radiation, we'd have something much better than the melanin pigment that exists in our skin.

Using synthetic biology techniques, we have obtained the properties of Deinococcus radiodurans, allowing us to survive even under lethal radiation.

It's hard to perceive, but Homo sapiens, or humans, are evolving every day, and they're still evolving.

Thousands of years of human evolution have not only produced people with traits like the Tibetans, who can live in low-oxygen environments, but also Argentines, who can digest and metabolize arsenic, a chemical that would otherwise kill people.

Every day, the human body evolves through chance mutations that, by chance, produce people who can survive even the harshest conditions.

But to emphasize this "but" -- such evolution is not always there -- it requires two things that are not always available -- death and time.

In the challenge of finding new settlements in space, humans don't always have enough time to naturally evolve to adapt to planets other than Earth.

We live in what Edward O. Wilson called "genetic avoidance," an era of temporary cures for genetic defects like cystic fibrosis and muscular atrophy.

But as the days go by, we're approaching an era of volitional evolution, where we humans can determine the fate of our genes.

Adding and enhancing new capabilities in the human body is no longer a matter of "how," but "when."

Using synthetic biology to modify the genetic makeup of an organism raises ethical and moral questions, especially for us humans.

If we alter ourselves, will we lose our humanity?

So again, what is humanity?

Where should human wisdom go?

Isn't it a waste of time to be confused and stand by?

How can we use our wisdom to keep us safe from external threats and protect ourselves from ourselves?

I ask these questions not to create fear of science, but to shed light on the possibilities that science offers us.

We humans work together, carefully and courageously to find solutions.

Mars is one of humanity's destinations, but it's not the last.

Our final destination lies beyond the bounds of humanity's wildest possible intelligence, and beyond the line of what to do.

Space is freezing cold and a harsh and harsh environment.

Our journey to the stars will be challenging, and we'll be confronted with questions about who we are and how we'll evolve.

The answer will depend on whether or not we use the technology we've accumulated so far, and it will determine the fate of mankind in the universe.

thank you

(applause)

I have a confession to make: I've been obsessed with advertising, strangely enough.

There was an anime that aired on Saturday mornings, and I remember being more interested in the commercial than in the anime, wondering what the commercial was trying to tell me.

As a result, that action led me to my ideal job.

I became a partner at a large advertising agency in New York.

But all of a sudden, on February 23, 1997, everything changed when my brother Matt was shot in the head on the observation deck of the Empire State Building.

Suddenly, my family was thrown into the middle of a nightmare. My brother was told he wouldn't survive, but I had the chance to say goodbye to him, and after multiple emergency surgeries, Matt has now bravely recovered from a traumatic brain injury and is now alive.

he's definitely my hero

But (Applause) -- he's an admirable man. (Applause) But as much as this tragedy was a nightmare for our family, I sometimes think that the worst could have happened. In fact, every day, 90 families unfortunately lose loved ones -- brothers, sisters, sons, daughters, parents.

Not everything gets national coverage.

In fact, most of them go unreported.

Much of it goes unnoticed, in a country that has come to accept the stigma sweeping across America as the new "standard."

So I quit advertising because I wanted to do something about the stigma that is raging in America. I realized this: the challenge of preventing gun violence is actually the same thing that I loved about advertising, and trying to understand how people relate to each other.

Instead of selling products, just replace them with saving lives.

It's all about finding common ground where my desires and yours overlap.

You'd be surprised at how much we have in common when it comes to gun violence.

Let's take the example of people who love to hunt, and there are millions of people in America who love to hunt.

in some areas

Hunting is a proud tradition, and the first day of the hunting season falls on a school holiday.

what does the hunter want

hunters want to hunt, prefer guns

I'm a firm believer in the Second Amendment to the Constitution, which gives you the right to own a firearm.

I'm not saying there's nothing in common.

In fact, they have a lot in common, because it all stems from the basic idea of ​​keeping guns away from danger.

We don't take specific guns away from everyone.

We keep all guns away from certain people, people who, by all standards, think they shouldn't own a gun: convicted violent offenders, domestic violence perpetrators, mentally ill people who are at risk.

We're all grateful that Brady background checks are so effective at keeping guns out of the wrong hands.

In the last 20 years, the Brady Act has blocked 2.4 million federally licensed gun dealers from selling firearms to people who shouldn't own them.

(Applause) Whether you like guns or not, I think you'll agree that we shouldn't be doing Brady background checks and selling thousands of firearms every day at a trade show or online.

And -- (Applause) And there's also a number that a majority of Americans agree with: 90 percent of Americans support enforcing the Brady Act for all firearm sales, including 90 percent of Republicans, more than 80 percent of firearm owners, and more than 70 percent of National Rifle Association members.

this is not a controversial idea

In fact, only 6% of Americans are against it.

That number is about the same as the percentage of Americans who believe the moon landing was a hoax.

(Laughter) And it's probably the same percentage of people who believe governments are using broadcast television signals to try to control minds.

So far we agree with background checks.

But what about the 300 million guns already in homes across America?

First, it's important to understand that most guns are in the hands of law-abiding people like us, who have guns for a reason, like to keep their families safe.

That's why gun ownership is on the rise.

Ten years ago, 42 percent of Americans mistakenly believed that guns make homes safer.

63% of people currently believe that

Why?

I hate to say it because it's the dark side of advertising, but even the most outright lies can become reality if you repeat them over and over again.

And that's exactly what's happening right now.

Billions of dollars are being spent on corporate gun lobbying to prevent the Centers for Disease Control and Prevention from studying gun violence as a public health problem. Pediatricians are unable to talk to parents about the dangers of having guns in their homes.

They are desperate to hide the truth because they see it as a threat to their interests.

People are dying every day as a result.

many of them are children

Nine children are shot in America every day.

900 children and teenagers take their own lives each year.

The point here is that he was killed by his parent's gun.

Two-thirds of all school shootings involve guns taken from home, including the shooting at Sandy Hook Elementary School.

I met with the parents of the children involved in the crime, which is the most heartbreaking part of my job.

they are not evil

They're living with the unimaginable consequences of making a very wrong decision based on very bad information. The information was brought to them by heartless people.

The result is a nightmare, not just my family, but ultimately everyone's nightmare.

I'm not talking about gun violence nightmares.

I'm talking about our dreams, our shared dreams of a safer, better future.

In my organization and in the Brady Campaign, that dream is reflected in the lofty goal of halving gun deaths in America by 2025.

Tonight, what I want you to keep in mind is the strong feeling that that dream is definitely within reach.

Because, dear ones, for every big movement that's happening in the world, there's a moment where you can look back and say, "That's when things really started to move."

I'm here to tell you that the move to end gun violence in America is coming.

(Applause) We're clearly at a tipping point, and millions of Americans are coming together like never before, following a common cause, and saying, "Enough is enough."

Enough of shootings in malls, movie theaters, churches and schools.

Gun violence has claimed the lives of so many women and young black men in their homes and streets.

So many situations where people who shouldn't own guns can easily get them.

Some cowardly group of politicians showing more interest in corporate gun lobbying than in the person who voted for them

Enough

(Applause) The good news is that I'm not the only one who thinks I've had enough.

more people say that

As proof of that, let's bring this guy, Kim Kardashian, to the conversation starters in America.

(Laughter) No kidding, this is the point.

What happens when the type of problem changes?

From political issues, lobby issues, to being part of pop culture, voices are coming from everywhere, being featured on celebrity shows, musicians, athletes,

The NBA also spoke up

Even conservative political pundits, who I could never have imagined, began to speak up.

The culture is truly changing, and there's going to be a TED Talk about that change this year.

It's about a cultural change taking place.

And Kim Kardashian is aggressively appealing to her 35 million Twitter followers to expand background checks.

Let's turn to the presidential election, which is currently heating up.

The Brady Act was a so-called avoidance topic for Democrats.

can't escape from it

Now, the Brady Act is one of the points of contention.

Some candidates, who until recently opposed gun control, have had to reverse their claims.

For someone like me, it was very unbelievable to see a candidate go around claiming that he or she had been given a low rating by the National Rifle Association for voting on gun bills.

We are still financially inferior to corporate lobbying, and that has to change.

But did you know?

We are wise, we are combative, and we are truthful.

and are on the attacking side

The Internet is said to democratize information.

Social media and the tools connected to it have democratized activism.

It gave me an idea of ​​what 90 percent support looks like.

Sometimes I think about it, we can come together, like millions of white blood cells, and attack in an instant.

And this, most importantly, will help bridge the embarrassing gap between what the American people want and what our elected officials are doing on gun control.

Until recently, the debate in Congress was about the voices of opponents of gun control, with 6 percent of those who disagreed, and 10 times as many in favor.

we are upside down in numbers

After the tragic events in San Bernardino, we made a flood of calls to Congress.

I made 15,000 phone calls in 24 hours.

And what happened?

The bill gained support, and no one expected it to see the light of day so soon.

We are witnessing a movement to repeal the ugly gun lobby bills enacted during the dark period of the last decade.

The gun lobby's grip is clearly beginning to crumble.

I witnessed President Obama's historic executive order.

It's not done yet, but it could save lives by expanding Brady background checks to thousands of gun sales outlets that weren't doing it before.

And we march across America, and we can't just wait for Congress to act.

We're going to march across the United States, across states, just like we did with the Marriage Equality Act.

we are trying to win

Congress is often the last to realize they've done something wrong historically.

It's always when the American people shake Congress.

We're doing it right now. We're at a tipping point.

Just recently, I got on a plane for a big talk, and it wasn't as nerve-wracking as this one, but the woman sitting next to me happened to be drinking and watching one of my all-time favorite TV shows, "Madman," a period drama about 1960s advertising.

As I was trying to wrap up my talk, I would occasionally look at the screen that the woman next to me was looking at. Every time I looked at the screen, there were scenes of smoking in the office, near children and pregnant women, and scenes of people drinking while driving, driving without a seatbelt, and sexually harassing a colleague.

And I had an epiphany, and for those of us who dream of an end to gun violence, it's such a great idea.

Think about how much the world has changed in a relatively short amount of time. What was once considered the norm and the norm, what was seductive and sexy, has turned into something reprehensible over the course of a few generations.

It's that commonality that has the potential to make a big difference against gun violence.

That's my dream. I hope that one day, someday, period dramas will be created about nightmares about gun violence, and children of the future will only be able to imagine the tragedies that happened in the past.

thank you

(Applause) Thank you.

(Applause) Thank you.

(applause)

As of 2018, there are approximately 2.5 billion smartphone users in the world.

If you pry open all of their latest smartphones -- which is still only a fraction of the total number being manufactured -- and sort them into their component parts, you'll get about 85,000 kilograms of gold, about 875,000 kilograms of silver, and about 40 million kilograms of copper.

How did these expensive things get into smartphones, and can they be reused?

Gold, silver and copper are actually just a few of the roughly 70 chemical elements that make up the average smartphone.

These are divided into different groups, the two most important being rare earths and precious metals.

Rare earths are 17 specific elements that are actually common in the earth's crust and found in low concentrations in many parts of the world.

These elements have a wide range of magnetism, luminosity and conductivity, and are essential in modern technology.

In fact, of the 17 rare earths, smartphones and other electronic devices may contain as many as 16.

These rare earths are the main materials used in smartphones to create screens and color display devices, increase conductivity, and generate unique vibrations.

But equally important is that removing these elements from the earth is associated with exacerbating environmental impacts.

Rare earths are easy to find, but in many regions it is not economically feasible to extract them due to their low concentrations.

In most cases, extraction requires a method called open pit mining, which exposes large areas of ground.

This method of mining destroys large areas of natural habitat, causes air and water pollution, and threatens the health of people in nearby communities.

Another group of smartphone materials carries similar environmental risks. Metals in this group include copper, silver, palladium, aluminum, platinum, tungsten, tin, lead and gold.

Magnesium, lithium, silicon dioxide, and potassium are also mined to make smartphones, all of which are associated with widespread destruction of natural habitats and pollution of air and water.

Mining is also fraught with social concerns, such as the massive expulsion of humans and animals to make way for industrial activity, and often poor working conditions for workers.

Finally, the production of smartphones also requires oil, which is one of the major contributors to climate change.

And this goes hand in hand with the global conundrum that's making smartphones worse.

What's more, the materials that can be mined to make smartphones are not inexhaustible.

It'll run dry one day, and for some materials, no effective replacements have yet been found.

Despite this, the number of smartphones is steadily increasing, with nearly 3 billion expected to be in use by 2019.

This means that there is an urgent need to reclaim the abundant resources in our smartphones.

So if you have an old smartphone, why not consider your options before throwing it away?

To minimize waste, you can donate to a recycling charity, take to a recycling facility for electronic waste, or find a company that repairs and retrofits old models.

But even recycling companies need our oversight.

Just as the production of smartphones is fraught with social and environmental problems, so too is the dismantling of smartphones.

Electrical and electronic waste is sometimes deliberately exported to countries where labor is cheap but working conditions are poor.

The vast workforce, often made up of women and children, may be underpaid, lack training in disassembling smartphones safely, and may be exposed to elements like lead and mercury, which can inflict irreversible damage to the nervous system.

Smartphone waste can end up in huge landfills, leaching toxic chemicals into the soil and water, which is like a mirror reflection of the problems that occurred in the mines where the elements were extracted.

Your smartphone contains a lot more than it looks

Smartphones are made up of elements produced in many countries, and they are related to the effects that are unfolding on a global scale.

So until someone invents a fully sustainable smartphone, we have to come to terms with the impact of this technology on a wide range of places and people.

In Africa, 200 million people contract falciparum malaria each year, and 500,000 die from it.

I want to talk to you today about the malaria vaccine.

None of the vaccines developed so far are very effective.

Why?

We've been working on vaccines for over 100 years.

Initially, technology was limited.

I could barely see what this parasite actually looked like.

Today's world is full of technology, including advanced imaging techniques, omics research -- genomics, transcriptomics, proteomics.

By leveraging these, we're able to get a much clearer picture of just how complex this parasite really is.

Yet our approach to vaccine development remains primitive.

To develop good vaccines, we need to go back to basics and understand how our bodies deal with this complexity.

If you catch malaria frequently, your body will gradually adapt to it.

Infected but not sick

The secret is hidden in antibodies

My team went back to this complex parasite, and used antibody samples from African survivors of malaria to look at the parasite to answer the question, "What kind of response does the antibody have when it works?"

Now we have identified more than 200 new proteins, many of which have not been targeted for vaccine development.

We researchers may be missing an important part of this parasite.

Until recently, we used to do cohort studies to test whether a given protein of interest would be important for vaccine development.

Typically, about 300 people in one village in Africa were sampled and analyzed for the presence or absence of antibodies to the protein in question to see if they had been infected with malaria.

Over the past 30 years, these studies have examined only a few types of proteins, and surveys have been conducted in relatively small samples, often in one location.

Research results are inconsistent

My team turned 30 years of research like this into one exciting experiment, and it did it in just three months.

Innovatively, we collected 10,000 samples from 15 different locations in seven African countries, with a wide range of age, age and severity of malaria infection.

We've used our knowledge of omics to prioritize parasite proteins and synthesize them in the lab, so we've recreated the malaria parasite on a chip.

I am very proud of what we have accomplished in Africa.

(Applause) The chip is a little glass slide, but it gives you more power than you might expect.

We collected data on over 100 antibody responses simultaneously.

what were you looking for

That's the secret to an effective antibody response, to predict which ones are likely to be good malaria vaccines.

We're also trying to understand how antibodies work specifically against parasites.

how to kill

Are we going to attack from multiple angles or will there be a synergistic effect?

How many antibodies do you need?

In our research, we found that just having a single antibody in small amounts wasn't enough.

We may need high concentrations of antibodies against multiple proteins in the parasite.

Antibodies also kill parasites by a variety of mechanisms, so studying just one mechanism may not fully reflect reality.

As we can now observe this parasite with greater precision, my team is focused on how our bodies overcome this complexity.

By doing so, I believe we can make the breakthroughs needed to make malaria a thing of the past through a vaccine.

thank you

(Applause) (Cheers) (Applause) (Shoham Arad) How close are we to a vaccine?

Faith O'Shea: We're just getting started. We're just starting to figure out what we need to put in the vaccine, and then we're going into the actual production.

We can't say that we'll have a vaccine any time soon, but we're definitely getting there.

(Shoham) I have high hopes.

(Faith) I'm really looking forward to it

(Shoham) Tell me about SMART What does it mean? And why is it important to you?

(Faith) SMART stands for South-South Malaria Antigen Research Collaboration.

"South-South" means that we in Africa are on the same page and working with each other, not always relying on the United States or Europe, because there are some pretty strong forces within Africa as well.

So, apart from our goal of developing a malaria vaccine, SMART is also developing African scientists, because the burden of disease in Africa is so great that Africa needs people to continue to expand the possibilities of science.

(Shoham) That's right.

(Applause) Okay, last question.

It's been mentioned a little bit, but what would actually change if we had a malaria vaccine?

(Faith) We can save 500,000 lives each year.

200 million people get malaria every year

Malaria costs Africa an estimated $12 billion annually.

this is about the economy

Africa will prosper if we have a vaccine

(Shoham) Thank you

thank you

(applause)

There's an actor called Dustin Hoffman.

Many years ago, I was in a movie, which you may have heard, called "The Graduate."

There are two important scenes in this movie.

One is the scene of seduction

Today's story is not about that

(Laughter) The other scene is when the protagonist is lured out to the pool by an older man, and the man basically said one word to the protagonist, who had just graduated from college.

— Of course you all know —

"plastic"

(Laughter) There's just one problem, and that's completely wrong advice.

(Laughter) And the reason is not "plastic."

Because it should have been "silicon"

Because the basic patent for the semiconductor had already been written and filed, and the semiconductor had already been made.

The name Silicon Valley was only born in 1967, and The Graduate was released that year.

The following year, 1968, Intel was founded.

So if the protagonist had the right advice, he could have been very successful — maybe with both of them.

(Laughter) So let's see what advice you can give so that the next graduate doesn't have to be a Tupperware salesman.

(Laughter) In 2015, what advice would you give your graduates by the pool? It's just one word.

I think it's a "life code"

What is a "life code"?

different ways to program an organism

Instead of a computer, what we program is viruses, retroviruses, proteins, DNA, RNA, plants, animals, and other organisms.

I know you think it's amazing how much we have the power to manipulate life at will, but we programmed it and what we're doing now is what humans have been doing for thousands of years: breeding, changing, mixing, matching, coming to all life, and just accelerating it now.

nothing new

Ordinary wild mustard, when bred in a certain way, becomes broccoli.

otherwise it would be kale

And in another way, it becomes cauliflower.

What's on the 100 percent natural organic food market is actually plants whose life codes have been altered over time.

Today, if I were to put the difference in a completely nonsensical way to put it: [intelligent design/intelligent design] (Laughter) we're in the early days of intelligent design.

Instead of randomly changing the code and seeing the results after a few generations, we introduced a specific gene or protein and deliberately changed the life code.

It's accelerating the desired evolution.

For one example

Some of you may think about sex from time to time.

We've changed sex too, and we take that transformation for granted

I think it's perfectly natural

The changes that have occurred over time — usually resulting in sex = baby —

In today's world, sex + contraceptives = no babies

(Laughter) We think this is perfectly normal and natural, but it's something we haven't seen in most of human history.

not found in the animal kingdom

In doing so, we took control and separated sex from pregnancy.

As you can imagine, the result was that I started experimenting with things that went further than that.

Not in the arts of painting or sculpture, but in assisted reproductive medicine.

What is Assisted Reproductive Medicine?

Medical treatments such as in vitro fertilization

It means a lot to people who need in vitro fertilization.

Some people are infertile

But in doing so, we separate sex, pregnancy and babies.

Not only did it control the timing of birth, but it also decoupled the time and place of fertilization.

I cut the baby out of the act of sex and out of the body.

That's what you're thinking right now, too, twins.

Sperm, eggs, and fertilized eggs can be frozen.

that means

Helpful for people with cancer

Because you can store the fertilized egg before undergoing chemotherapy or radiation,

No worries about being exposed to the atomic bomb

You can freeze a fertilized egg and leave it to a surrogate mother, which means that sex is separated from time.

It's possible that one half of a 2-egg twin will be born 50 years later.

(Laughs) 100 years from now

200 years from now

These three things are really big changes, and I'm not talking about the future.

It's happening right now that we take for granted.

in the life code

It turns out that viruses have an amazing ability to change plants, animals, and it might even change human evolution.

That's something Steve Garrans and I have been thinking about a lot.

take a little risk

Like powerful technologies like electric car computers, lifecord manipulation can be misused.

scaring people

Because with this technology, it's even possible to turn humans into chimeras.

Like a phantom beast mixed with animals from Greek mythology

There's also a way to change your blood type by manipulating your life code.

And then there's the transplantation of male cells into the female body, and vice versa. It sounds terrifying, but once you know why, it's not, because that's what happens with bone marrow transplants to treat cancer.

Transplanting someone else's bone marrow is saving lives, even if it seems like it's changing a basic part of the human body.

If you're thinking about this, let me tell you a story that happened 20 years ago.

This is Emma Ott

I just entered college

I am studying accounting

He was a member of two college sports teams and was the alumni representative.

It hasn't changed much, but she's the first human born to three parents.

Why?

Because she could have inherited a deadly mitochondrial disease.

By extracting mitochondrial DNA from a donor egg and inserting it into the mother's egg, it saved an unborn child's life.

It's also germline engineering, which means that her children will be saved, and they won't have to repeat the same process.

Her grandchildren and great-grandchildren will be saved, and their mitochondrial DNA will be passed down from generation to generation.

That's what people worry about

Twenty years ago, the world's authorities said, "Let's do some research."

There are risks in administering therapy, but there are risks in not doing it, because dozens of people have already been saved by this technology, and the debate about it has been going on for the last 20 years.

And while you're spending your time thinking and thinking, "Maybe I should do more research on this and that," and whether you act or not, there's a price to pay.

Yes, it's something completely unnatural, like treating a life-threatening disease.

It may be natural for people to die from polio, smallpox, tuberculosis, and other devastating epidemics.

We give people artificially engineered vaccines because the benefits seem to outweigh the risks.

Both plants and animals have been artificially bred to feed the world's seven billion people.

You can also create new life forms.

Again, this is a scary story, and it's likely to be controversial, but it's about the lifeforms on the dining table.

The flower you bought from the florist on the table is hardly a product of nature, because it has been modified over and over again to be that color, that size, and that it will last for a week.

I usually don't give wildflowers to my loved ones because they don't last very long.

These are things that Darwin never imagined.

For the last four billion years, two things have separated the survival and extinction of life on Earth: natural selection and mutation.

The mechanism that determined life and death has now been completely overturned.

We are completely parallel to nature's evolutionary system, yet we are mutating against it.

let me explain

This is natural selection

This is artificial selection

(Laughter) Humans did something similar thousands of years ago in Central Asia, where they started breeding wolves and turned them into dogs.

Now I'm making dogs bigger and smaller.

If you took a Chihuahua out of a Hermès handbag on Fifth Avenue and released it into the grasslands of Africa, natural selection would undoubtedly occur.

(Laughter) The cornfield is still the natural one.

No matter what happens, it's very unlikely that you'll find the same plants growing neatly and in the same way in a primeval forest and not seeing any other plants.

Selection of items to be discarded or preserved in corn cultivation

It's a process of artificial selection.

The same thing is happening in wheat fields and rice fields

The same is true in the city and in the suburbs.

In fact, half the surface of the earth is artificially engineered in some way, leaving behind what it wants to pick and choose, which is why grizzly bears don't roam the streets of Manhattan.

What about mutations?

have a mutation

Antonio Alfonseca

He was known by the nickname "Octopus"

was the best relief pitcher in 2000

A mutation gave him six fingers on each hand, which would have been very useful for a pitcher.

(Laughter) For artificial mutation,

beer and

We have wine and yogurt

No matter how much I roam the woods, I can't find wild cheese.

same thing with yogurt

made by us with technology

Interestingly, while doing so, I learned a lot

CRISPR, one of the most powerful gene-editing mechanisms by itself, was found in yogurt.

With cell engineering, we've made eight of the top 10 drugs, including Humira, the best-selling drug for treating rheumatoid arthritis.

life code is

really powerful

It's a way to program life forms. Nothing changes us like this.

Consider the 5 Principles and Guidelines as a starting point for the Life Code.

Principle #1: Take responsibility for manipulating the life code

because we are in control

not a natural mutation

it's our choice

What happened naturally —

not a random event

It's not an order from anyone other than us.

It's our fault. It's like the rules of a pottery shop, but if you break it, it's our fault.

Principle 2: Diversity should be recognized and celebrated

There were at least 33 genera in the Hominidae, but they're extinct outside of humans.

non-humans are extinct

But the natural state of the earth is that there are so many different types of humans, and most of us have some Neanderthal genes.

Some have Denisovan genes.

It seems that some people in DC have more of that gene.

(Laughter) Principle #3: Respect other people's choices.

Some people say they will never change

There are people who want to change everything

Some people say that even if plants are changed, animals are not.

Some want to change themselves

Some people want to evolve themselves

Diversity is a good thing, because even though we think humans are diverse, we are on the brink of extinction. Humans started with one African woman, and as a result, 55 African chimpanzees have more genetic diversity than 7 billion humans.

Principle #4: About a quarter of the planet should be left untouched.

Everything influences each other and doesn't have to be connected

It should be part ocean and part land

We shouldn't control all evolution on earth.

While continuing the artificial evolution system

I also want to leave Darwin's evolutionary structure as it is.

It's very important that both of these things go in parallel and not overwhelm nature's evolution.

(Applause) Finally.

There has never been a more exciting human adventure.

Never before has mankind possessed so much power.

It's a sin to hide and not participate in this out of fear.

Participation in ethical and political ways

Participation as an affiliated company is also possible

We can just think together about the direction of medicine, about the direction of the industry, about the future of the world.

Ladies and gentlemen, it's a crime to ignore someone who shows up by the pool, one word, one word, if that word is "life code."

Thank you very much

(applause)

Seven years ago, a student came to me seeking investment in a company and said,

“My three friends and I are going to start a company and enter the online sales business to make the industry lively.”

"So you devoted your summer to it?" I asked.

"No, we all went to internships in case we failed."

"Yes, but you're going to work full-time when you graduate, right?"

"No, not really. We're all going to get other jobs just in case."

Six months later, the day before the company's launch, we still don't have a website that works.

"Your website is the lifeblood of your company.

Without the site, it would be useless.”

Needless to say, I declined the investment.

The company name that followed was Warby Parker.

(Laughter) I sell glasses online.

They're now recognized as the world's most innovative company, with an enterprise value of over $1 billion.

Currently, I leave all my investments to my wife.

why i didn't see through

In order to explore that, I am researching "original people."

Original people don't pander, they don't just have new ideas, they act to protect them.

It's about people stepping out and raising their voices.

They use their imagination to change the world.

They are the right people to invest in.

It's completely different from what I imagined

Today, I'd like to share with you three things that I've learned: how to spot the original and incorporate a little bit of their traits.

The first reason I held off investing in Warby Parker was that it was taking too long to launch.

We're all familiar with the mentality of the procrastinator.

To tell you the truth, I'm the opposite, I'm a "go ahead" guy.

it's a proper term

You know the panic when a critical deadline is just hours away and nothing has been done yet?

I felt it months ago

(Laughter) It all started back when I was a kid, obsessed with Nintendo games.

I woke up at 5 in the morning and started playing the game, and I didn't stop until I won it.

Eventually things got out of hand, and a local newspaper came to interview me and wrote an article about me, titled "Nintendo Brings Darkness."

(Laughter) (Applause) Since then, instead of growing teeth, I've lost my hair.

(Laughter) But this experience really helped me in college, because I was able to finish my senior thesis four months before the deadline.

I was proud of it, but a few years ago-

One day, a student named Ji-hye came up to me and said, "The more I procrastinate, the more creative ideas come to me."

"That's fine, but what happened to submitting the four reports?"

(Laughter) In fact, she's the most creative student, and that's what I'm looking for as an organizational psychologist.

instructed her to take the data

she went to many companies

I did a survey about how often people procrastinate.

We then ask our supervisors to rate the creativity and originality of the respondents.

Sure enough, procrastinators like me who get to work quickly and finish tasks quickly scored less creatively than moderately procrastinators.

I asked Jihye to find out what the procrastinator's results were.

"I don't know because you haven't submitted it yet."

(Laughter) Just kidding.

As you can see, people who procrastinate until the very end are just slacking off and can't come up with new ideas.

On the other hand, those who get started on the fly are also so anxious that they can't think outside the box.

Original people have a place in neither of those places.

why

Creative people may work poorly,

Procrastination may not breed creativity.

To find out, we conducted an experiment

We gave the participants the task of generating new business ideas, and asked a third party to read them and evaluate the originality and usefulness of the ideas.

Some of the participants were asked to start working on the task immediately.

Others were randomly assigned and lured into Minesweeper for five or ten minutes to procrastinate.

Sure enough, moderate procrastinators were 16 percent more creative than the other two groups.

The fun of the game did not affect this result, because there was no increase in creativity when the challenge was discovered after playing the game.

It's only when you procrastinate after you've been told you're going to work on a task that it's going to have an effect.

Procrastination gives us time to let ideas run, allowing for non-linear thinking and unexpected leaps.

Around the time I finished these experiments, I started writing a book about original people, and I thought to myself, "This is the perfect opportunity to learn to procrastinate by writing a chapter on procrastination."

I procrastinated procrastinating. Like any proud procrastinator does, I woke up early the next morning and made a to-do list of procrastination steps.

(Laughter) I worked very hard towards the goal of not moving forward toward the goal.

One day, halfway through the procrastination chapter, I literally stopped writing mid-sentence and let it sit for a few months.

it was painful to death

But when I reopened, a lot of new ideas came to me.

Aaron Sorkin said, "What you call procrastination, I call thinking."

In the process, I've learned that many of the original greats in history are procrastinators.

For example, Leonardo da Vinci

It took me 16 years of working and resting to paint the Mona Lisa.

he feels like a loser

I wrote that many times in my notes

But what he learned by detouring into the world of optics changed the way da Vinci painted light and made him a better painter.

Martin Luther King Jr. is

On the eve of the March on Washington, where he delivered the most important speech of his life, he worked on the script until just past 3:00 a.m.

As he sat in the audience waiting to take the stage himself with the audience, he was still writing notes and scraping lines.

After 11 minutes on stage, he didn't use the words he had prepared, but uttered the four words that changed history: "I have a dream."

That word wasn't in the script

By procrastinating the task of completing his speech until the last moment, he was keeping the widest range of ideas available to him.

Because the sentences were modifiable, he was free to improvise.

Procrastination is a productivity vice, but it can be a creative virtue.

Many of the original greats are characterized by being quick to start and slow to finish.

That's what I got wrong about Warby Parker.

After they had been procrastinating for six months, I said to them, "A lot of companies are starting to sell eyeglasses online."

they missed the first mover advantage

But what I didn't realize was that in the meantime, they were looking for ways to make it easier for people to order eyeglasses online.

To begin with, the first-mover advantage is almost an urban legend.

There's a well-known study that looked at more than 50 product categories, comparing the pioneers who pioneered the market with the latecomers who improved and launched something else.

First movers have a failure rate of 47%, while latecomers only have 8%.

Facebook waited until Myspace and Friendster came out to create a social network.

Google came years after AltaVista and Yahoo

After someone else's idea, it's much easier to improve it than to start from scratch.

I've learned that you don't have to be the first to be original.

It's good if it's different and better

But there are other reasons why I passed on Warby Parker.

they were full of anxiety

I wondered if I didn't have the courage of a trailblazer to set another path, just in case.

[I can't say this enough, but I'm a big deal.] (Laughter) It's true that on the surface, many creative people are confident.

It's just that we deal with it differently.

See, in the creative process, many of us follow these thoughts: [1: This is great, 2: Weird, 3: No, 4: I'm no good, 5: Maybe, 6: Great]

(Laughter) And I've discovered through research that there are two kinds of doubt.

Self-doubt and idea skepticism

Self-doubt paralyzes thought

it stops moving

On the other hand, skepticism of ideas empowers

They push themselves to challenge, to experiment and to refine themselves, just like Dr. King.

So the key to being original is very simple: stop jumping from number three to number four.

Instead of saying, "I'm a bad person," say, "I'm always bad the first few times, but I'm just not there yet."

so what should i do

In fact, the web browser you use every day has a hint.

By looking at the web browser you're using, you can predict your work output and contribution.

Some people don't like this result. (Laughter) Firefox and Chrome users proved to be much better than Internet Explorer and Safari users.

Hooray!

(Applause) By the way, tenure is 15 percent longer for the latter.

The reason is not technical merit

We don't see any difference in typing speed among the users of each browser, and they have similar levels of computer knowledge.

The problem is how you came to use that browser.

If you're using Internet Explorer and Safari, both of which were originally installed on your computer, you accepted the default settings that were given to you.

To use Firefox and Chrome, you have to question your default settings, explore other options, and be a little resourceful and download a new browser.

People react to this research by saying, "Well, you can upgrade your browser and you'll be more productive at work."

(Laughter) No. The point is to be proactive and question the existing and find better options.

Those who can do it well will approach the opposite of déjà vu by themselves.

Its name is "Bujade"

(Laughter) Bujade is when you suddenly see something you've seen many times before, and then suddenly see it in a new light.

It's about a screenwriter who worked on a screenplay for a movie that had been rejected for more than half a century.

Until then, every version of the script had a bad princess as the main character.

Jennifer Lee questioned whether it made sense.

She rewrote the first act, transforming the villain into a tormented hero, and "Frozen" became the most successful animated film of all time.

The lesson from this anecdote is simple.

When in doubt, don't just let it be

(Laughter) What about fear?

Ingenious People Feel Fear

They're afraid of failing, but unlike us, they're more afraid of failing to try.

They know it's a failure to open a business and go bankrupt, but it's also a failure to not even open a business.

It's not the things you do that you regret most later on, but the things you don't do.

The past you want to redo is a missed opportunity, as science has proven.

I recently heard from Elon Musk that he doesn't believe Tesla will succeed.

For the first few launches by SpaceX, he was convinced that he would fail to get back into orbit, let alone return, but the importance of it compelled him to try.

Most of us don't want to try even if we have an important idea.

I'm here to tell you something good

You're not judged on the basis of a bad idea.

many people misunderstand

When we surveyed a wide range of industries and asked people about their big ideas and their most important proposals, 85 percent of them chose not to talk, they just kept quiet.

They were afraid of shame and concerned about appearance.

But the truth is, the minds of original people are full of bad ideas, and there are tons of bad works.

For example, the person who invented this

Do you mind that the inventor invented a spooky talking doll that terrifies adults and children alike?

You wouldn't, would you honor Thomas Edison for inventing the light bulb?

(Laughter) The most creative and greatest people in any field are the ones who fail the most, because they try more than anyone else.

Consider the world's greatest classical music composers.

Why do some composers have more information in encyclopedias than others, or have their compositions re-recorded more often than others?

One of the most compelling reasons is the sheer number of songs they produced.

The more you make it, the more variety you have, and the more likely you are to come up with something truly original.

Even Bach, Beethoven, and Mozart, the three most important figures in classical music, have composed an incredible number of pieces before finally arriving at a rare masterpiece.

So it's strange, isn't it? How did this person succeed without mass production?

I don't know the reason for Wagner's success.

But most of the time, if you want to be more original, you need to generate more ideas.

When the founders of Warby Parker came up with a name for their company, they searched for a unique, non-negative, sophisticated expression to establish their retail brand.

Now, when you put it all together, it turns out that the original people aren't all that different from us.

They too have fears and doubts and procrastinate.

Some ideas are bad

Rather than being a hindrance, that aspect helps them to succeed.

If you see that side, please don't make the same mistakes I did.

don't give up

If it's yourself, don't truncate it either.

Starting quickly and taking time to finish is what fuels your creativity. Doubting your ideas and embracing the fear of failing to try is what motivates you.It takes a lot of bad ideas to produce a few good ideas.

Yes, it's not easy to be creative, but I'm sure there's no better way to make our world better.

thank you

(applause)

Let's rethink how human life on Earth is organized.

We think of the earth as a human body and that we live on it.

The skeleton is the transportation system, the roads, the railroads, the bridges, the tunnels, the airports, the ports, that allow us to travel all over the continent.

The vascular system that powers the human body is the oil and gas pipelines and power grids.

this provides the energy

The communication nervous system is the internet cable, the satellite, the cell phone network, the data center, which allows us to share information.

This ever-expanding infrastructure currently consists of 64 million kilometers of roads, 4 million kilometers of rail networks, 2 million kilometers of pipelines and 1 million kilometers of internet cables.

What about borders?

Our borders are less than 500,000 km

Let's make a better world map

The first step is to overcome the myths of the past.

Every historian knows the saying, "Geography decides fate."

Those are serious words

has a fatalistic sound

It conveys that landlocked countries are destined for poverty, small countries cannot escape from their larger neighbors, and distances cannot be overcome.

But as I travel around the world, I always notice a much stronger force that is spreading rapidly everywhere: the power of connectivity.

The revolution of connectivity that is sweeping our planet has spread across all domains, including transportation, energy, and communications, and has dramatically increased the mobility of people, goods, resources, and knowledge, and we can no longer separate geography from connectivity.

I call the confluence of these two forces "the geopolitics of connectivity."

The geopolitics of connectivity describes a quantum leap in the movement of people, resources, and ideas, but it's also an evolution in itself -- the evolution of the world -- from political geography, the way we canonically divide the world, to functional geography, the way we actually use the world, from nations and borders to infrastructure and supply chains.

The fabric of the world we live in is evolving from vertically integrated empires in the 19th century to horizontally interdependent states in the 20th century to a global networked civilization in the 21st century.

Connectivity, not sovereignty, is the organizing principle of humanity.

(Applause) We are realizing this global network civilization, we are literally building it.

The combined global defense budget and military spending totals just under two trillion dollars a year.

Global infrastructure spending is expected to reach $9 trillion a year over the next decade.

And it's only natural

We've lived on the infrastructure assets we had when the world had 3 billion people, but now we're over 7 billion, over 8 billion, and eventually over 9 billion.

So, roughly speaking, we're going to need about $1 trillion per billion people per year to meet our basic infrastructure needs.

And as expected, Asia leads the way.

In 2015, China announced the launch of the Asian Infrastructure Investment Bank, which it hopes will work with other organizations to build a network of "iron silk roads" from Shanghai to Lisbon.

And as these "geo-engineering" technologies advance, infrastructure spending and infrastructure construction over the next 40 years will exceed that of the last 4,000 years.

let's stop here for a moment and think

Investing far more money in the infrastructure of global society than in the tools of social destruction can have profound consequences.

Connectivity is a way to optimize the distribution of people and resources around the world.

It's a way for humanity as a whole to exert a power that exceeds the sum of its individuals.

I think that's what's happening now

Along with connectivity, there's another big trend in the 21st century: global urbanization.

Cities are the infrastructure that defines us

By 2030, more than two-thirds of the world's population will live in cities.

And cities aren't just tiny dots on a map, they're huge archipelagos that stretch for hundreds of kilometers.

Vancouver, where we are now, lies north of the Cascadia population center, but extends south across the US border to Seattle.

A powerhouse of technology, Silicon Valley stretches from north of San Francisco to San Jose south to Oakland across the bay.

The Los Angeles metropolitan area now stretches beyond San Diego and across the Mexican border into Tijuana.

San Diego and Tijuana share an airport terminal, and you can leave either country.

A high-speed rail network may eventually connect the entire Pacific coast.

The megalopolises of the northeastern United States begin in Boston, pass through New York and Philadelphia, and reach Washington, D.C.

More than 50 million people live in this area, and there are also plans for a high-speed rail network here.

On the other hand, Asia is where megacities are emerging.

More than 80 million people live within this streak of light that runs through Tokyo, Nagoya, and Osaka, making up a large portion of Japan's economy.

The world's largest megacity

- For now

Meanwhile, in China, megacities with a population of nearly 100 million people are emerging.

The Bohai coastal region near Beijing, the Yangtze River Delta around Shanghai, and the Pearl River Delta, which stretches north from Hong Kong to Guangzhou.

Inland, there are the Chongqing-Chengdu megacities, whose total area is comparable to that of Austria.

And all of these megacities are approaching $2 trillion in GDP, which is roughly the size of India's current GDP.

Imagine if eligibility for an international diplomatic conference like the G20 was based on economic size instead of nation status.

Some of China's megacities will join, while countries like Argentina and Indonesia will lose their seats.

If you look at India, it's population is on the verge of overtaking China, and it's home to many megacities, like the Delhi metropolitan area and Mumbai.

In the Middle East, one-third of Iran's population is centered around Tehran.

Most of Egypt's 80 million people live in the region between Cairo and Alexandria.

A string of city-states is emerging along the Persian Gulf, stretching from Bahrain and Qatar to the United Arab Emirates to Muscat, the capital of Oman.

Then there's Lagos, Africa's largest city and the economic center of Nigeria.

Connecting the Atlantic Corridor -- There are plans to develop a rail network that will run from Lagos through Benin, Togo, Ghana, and to Abidjan, the capital of Côte d'Ivoire.

The countries I just mentioned are suburbs of Lagos, so to speak.

In a world of megacities, nations can become suburbs of cities.

By 2030, there will be 50 megacities around the world.

So which map says the most?

The old map of 200 countries on the wall of every house? Or maybe a map of 50 megacities?

But even this isn't perfect, because unless we understand how they are interconnected, we don't understand individual megacities.

People migrate to cities for connectivity, and connectivity is what makes these cities thrive.

The GDP of many cities, such as São Paulo, Istanbul, and Moscow, is approaching one-third to one-half of the national GDP, and even surpassing it.

And just as importantly, the value of each city cannot be assessed without understanding the role played by the flows of people, money and technology that bring prosperity to life.

Take the Gauteng province of South Africa, where you have Johannesburg and Pretoria, the capital city.

Again, GDP is over a third of South Africa's total.

Another important point is that most of the multinational companies that have direct investments in South Africa and across the continent have their offices here.

Cities become part of global value chains

We are playing a part in the global division of labor.

this is the intention of the city

I've never seen a mayor who wants to isolate his city.

Every mayor understands that their city belongs to a country, but it also belongs to a global networked civilization.

Now, many people are worried about urbanization.

I think cities are destroying the planet

On the other hand, right now — a network of more than 200 inter-city information exchanges is booming.

This is about the same number of intergovernmental organizations that exist today.

And this inter-city network is all focused on one purpose: sustainable urbanization, which is humanity's number one priority in the 21st century.

Is this successful?

Let's take climate change

It's clear that summit after summit in New York and Paris won't cut greenhouse gas emissions.

On the other hand, cities can exchange technology, knowledge and policies with each other to reduce the carbon footprint of their economies.

Cities are learning from each other

How do we build more zero-emission buildings, how do we deploy electric car sharing?

China's major cities are limiting the number of cars on the road.

And in many western cities, young people are moving away from cars.

Cities used to be part of the problem, but now they're part of the solution.

Another key challenge for sustainable urbanization is inequality.

When I spend hours or days cruising through a megacity from one end to the other, I see the tragic situation of extreme disparities on the same piece of land.

And yet, total global financial assets are approaching an all-time high of $300 trillion.

That's almost four times the world's real GDP.

Since the global financial crisis, we've taken on massive amounts of debt, but have we invested it in inclusive economic growth?

No, not yet

Only when we build enough affordable public housing and invest in strong transportation networks that connect people, not just digitally but physically, will cities and societies that are divided can come together.

(Applause) The United Nations' Sustainable Development Goals included infrastructure building because it's the foundation for everything else.

Business and political leaders are realizing that connectivity isn't about charity, it's about opportunity.

That's why business needs to recognize that connectivity is the most important asset of the 21st century.

I believe that not only do cities have the power to transform the world into a more sustainable and fairer world, but through connectivity between cities, the world will become more peaceful.

If you look at the regions that have built close ties across borders, you'll find that not only is trade and investment going up, but they're also becoming more stable.

We all know that the post-World War II industrial consolidation in Europe gave rise to the peaceful European Union that we have today.

By the way, it's also clear why Russia is the least connected of the major forces in the international system.

This helps explain the current tension.

So countries that are less involved in the system have less to lose by disrupting it.

In North America, the most important lines on the map are not the border between the United States and Canada, or the border between the United States and Mexico, but the dense network of roads, railroads, pipelines -- power grids, canals -- that hold the North American Union together.

North America needs connections, not walls.

(Applause) But the real potential for connectivity is in the former colonial world.

In every region where borders were once truly artificial, successive leaders have been pitted against each other.

But now, with a new generation of leaders in power, reconciliation is happening.

Let's look at Southeast Asia, where there are plans for a high-speed rail network linking Bangkok to Singapore and a trade corridor from Vietnam to Myanmar.

This region, now home to 600 million people, is coordinating agricultural resources and industrial production.

We are realizing what I call "Asian Peace", a stable relationship between Southeast Asian nations.

A similar phenomenon is taking place in East Africa, where six countries are investing in rail and other transport corridors to bring goods from landlocked countries to their markets.

Currently, these countries are coordinating public utility and investment policies.

We are realizing "Peace in Africa."

One area where this kind of thinking could be particularly useful is the Middle East.

With the Arab nations tragically collapsing, what remains but ancient cities like Cairo, Beirut and Baghdad?

In fact, of the roughly 400 million people living in the Arab world, almost all of them have migrated to cities.

There are places in a society or a city where water and energy resources are abundant and places where they are scarce.

The only way to fix this imbalance is not with wars and borders, but with pipelines and canals to improve connectivity.

Unfortunately, this has not yet materialized on the map of the Middle East.

Interconnected — To achieve an Arab peace, we should have internal integration and productivity-enhancing links with the peripheral regions of Europe, Asia, and Africa.

Now, you might not think that a politically unstable region needs connectivity right now.

But in the long run, history shows that better connectivity is the only way to bring stability.

Connectivity is the new reality in more and more regions

Cities and nations are coming together to form more peaceful and prosperous communities.

On the other hand, the touchstone will be Asia.

Can connectivity survive the rivalries between the Far Eastern powers?

After all, World War III is believed to start in the Far East.

Since the Cold War ended 25 years ago, at least six wars have been predicted in the region.

None have actually happened

Look at China and Taiwan

In the 1990s, everyone thought that World War III was going to start here.

Since then, the amount of trade and investment across the Strait has become so huge that in November 2015, the leaders of both sides held a historic summit meeting to confirm the One China principle.

Then, in early 2016, the independence-minded [Democratic Progressive Party] won a victory in Taiwan, but the basic direction remained the same.

Meanwhile, China and Japan have an even longer history of conflict, deploying military forces in the air and at sea to demonstrate each other's power over territorial disputes.

On the other hand, in recent years, Japan's largest foreign investment destination has been China.

Record number of Japanese cars sold in China

Where are the most foreigners currently living in Japan from?

yes it's china

China and India are in conflict and have three border issues, but India is the second largest investor in the Asian Infrastructure Investment Bank.

The trade corridor the two countries are building extends from northeastern India through Myanmar and Bangladesh to southern China.

The trade volume between our two countries has grown from $20 billion a decade ago to $80 billion today.

Nuclear-armed India and Pakistan are still battling over Kashmir after three wars, but at the same time they are negotiating most-favored-nation status and aiming to complete a pipeline from Iran through Pakistan to India.

Now about Iran

It was only two years ago that war with Iran seemed inevitable.

Why would all the great powers flock to Iran for business opportunities?

Ladies and gentlemen — I can't say for certain that World War III won't happen.

But it's pretty clear why it hasn't happened yet.

It's true that Asian countries are rapidly building up their military capabilities, but at the same time they're investing billions of dollars in infrastructure and supply chains.

These countries are more interested in each other's functional geography than their political geography.

That's why the leaders of nations are deliberating, sticking at the last minute and focusing on economic partnerships rather than territorial tensions.

The world can seem to be splitting apart, but increasing connectivity is the only way to put the fragmented world back together in a much better way than before.

By seamlessly covering the world with physical and digital connectivity, we will evolve into a world that transcends geographic constraints.

We are the cells and blood vessels of a global network of connectivity.

Every day, hundreds of millions of people collaborate through the Internet with people they've never met face-to-face.

More than 1 billion people cross borders every year, and it's expected to reach 3 billion in 10 years.

We're not just creating connectivity, we're giving it life.

We live in a global network civilization and this is our map -

It's a map of the world where geography doesn't decide your destiny.

There's another, new and more hopeful saying for the future: "Connectivity will decide your destiny."

thank you

(applause)

Fasten your seatbelt, we're heading to Mars

Not just a handful of astronauts, but thousands of people will colonize Mars.

it will be soon

I'm sure some of you will be involved in projects on Mars, and some of you will have children living on Mars.

It sounds crazy, so let me tell you how and when it happens.

But before we do that, let's consider the obvious question: Why should we go to Mars or anything like that?

Twelve years ago, I gave a TED talk about 10 factors that could lead to the sudden extinction of humanity.

We are extremely vulnerable to the whims of the universe.

A single asteroid could wipe out humanity.

To survive, you have to reach out beyond the Earth.

What a tragedy it would be if all of humanity's achievements suddenly vanished.

There's another reason to go: Exploration is in our DNA.

Two million years ago, humans evolved in Africa and slowly but surely spread to the far corners of the earth, aiming for the wilderness beyond the horizon.

We have something like that

That's how it prospered.

The greatest advances in civilization and technology have come from exploration.

Sure, you can do a lot for the money you spend on colonizing Mars.

It makes sense that we should take better care of our own planet.

There's also the fear that we're going to mess up Mars like we messed up Earth.

But just think what happened to us when John F. Kennedy said he was going to put humans on the moon.

Kennedy gave everyone a dream

How exciting it will be to see humans land on Mars.

And as we look back at the Earth, we may realize, after all this time, that we are all one. As we struggle to survive on Mars, we may realize how precious our home planet is.

So let's talk about the incredible adventure we're about to embark on.

But before that, some interesting facts about where we're headed —

This picture is a size comparison between Mars and Earth.

Mars is not Earth's sister planet

It's not even half the size of the Earth, but despite its small size, it has the same surface area on which you can stand as the Earth, which is largely covered by water.

Mars has a very thin atmosphere, one-hundredth of Earth's, and 96 percent carbon dioxide, so it's not breathable.

very cold

The average temperature is -63 degrees Celsius, but the actual temperature has a very wide range.

A day on Mars is 39 minutes longer than a day on Earth.

Seasons and years are twice as long as on Earth.

If you've ever wanted to fly around with wings, Mars has a lot less gravity than Earth, so when it comes to getting to the other side of the car, it's faster to jump over it than to go around it.

So Mars isn't exactly Earth-like, but it's a much nicer place to live than anywhere else in the solar system.

The problem is

Mars is so far away, a thousand times farther than the moon.

The moon is 380,000 kilometers away, and it took the Apollo astronauts three days to get there.

Mars is 400 million kilometers away and it would take eight months, 240 days to get there.

This means that if the rocket is launched on a special date and time that occurs only once every two years, Mars and Earth will be well aligned, and the flight distance will be the shortest.

240 days is a long time to spend with your co-workers crammed into a tiny ship.

Mars rocket performance so far has been terrible.

The United States, Russia, Europe, Japan, China, and India have launched 44 rockets to Mars, but most have missed or crashed.

Only 1/3 missions are successful

Plus, we don't currently have a rocket big enough to go to Mars.

Once upon a time there was a Saturn V

If we had two of them, we could have gone to Mars.

The Saturn V is the most magnificent machine mankind has ever built, and it took us to the moon.

But the last time the Saturn V was used was with the Slylab launch in 1973, and after landing on the moon, instead of going to Mars, they would do a shuttle.

Our current rockets are too small to send humans to Mars.

Getting to Mars is no easy task, and an interesting question is —

When will the first humans land on Mars?

Some scholars think that if we can get there by 2050, that's a big deal.

NASA recently said it could send humans to Mars by 2040.

you might be able

I personally believe that by 2035 NASA will be able to send humans to Mars orbit.

And frankly, I wouldn't try to send a rocket to Mars in 2035, because we'll be on Mars by then.

In 2027 it will be landing

The reason is that this man is determined to do so.

His name is Elon Musk, CEO of Tesla Motors and SpaceX.

He actually told me that he would send humans to Mars by 2025, but Elon is much more optimistic than I am, so I gave him a couple of years to spare.

nevertheless

You have to ask, can this guy really make it by 2025 or 2027?

Think about what 10 years will look like for Elon Musk.

What was this like 10 years ago?

Tesla's electric car

In 2005, a lot of people in the auto industry said it would take 50 years to get a decent electric car.

what about this?

SpaceX's Falcon 9 rocket is launching six tons of supplies to the International Space Station.

10 years ago SpaceX wasn't launching any rockets.

So I think there's a good chance that someone who revolutionized the automotive industry in less than 10 years and built a whole rocket company in less than 10 years could take humans to Mars by 2027.

The important thing to remember here is that this competition is no longer driven by governments or robots.

Private companies will go into space and happily take you to Mars.

this raises a big question

Can we actually live on Mars?

NASA won't be able to get humans to Mars until 2040, and even if civilians get to Mars much sooner, NASA is playing a big role in finding out if humans can survive on Mars.

Let's look at the problem like this

Humans need food, water, shelter and clothing to survive on Earth.

And to live on Mars, you need oxygen in addition to this.

Let's think first about the most important things on this list

Water is the foundation of all known life, but it's too heavy to carry from Earth to meet the needs of Mars.If we want to live on Mars, we need to find water.

If you look at Mars, it's so dry that the whole planet is like a desert.

But I know it's not

Even if you take the soil alone, it contains as much as 60% water.

There are still many orbiters in orbit around Mars, and what they've shown is -- this is a real picture -- there's a lot of frozen water in the craters on Mars.

It wouldn't be a bad idea to start building a colony there.

This is what the Phoenix probe looked like when it dug in 2008, and it shows that there's ice just below the surface of the soil, and the white stuff is ice.

The second photo was taken four days after the first, and you can see that some of it has evaporated.

Orbiters also tell us that Mars has a lot of groundwater and glaciers.

In fact, just melting the polar ice would cover most of Mars with 10 meters of water.

So there's a lot of water, but most of it is underground as ice, and it takes a lot of energy and effort to get it out.

This device was invented at the University of Washington in 1998.

It's basically a low-tech dehumidifier.

It turns out that the Martian atmosphere can be 100 percent humid at times.

This device is going to extract the water that humans need from the Martian atmosphere.

I have to worry about what to breathe next

I was very surprised to learn that NASA has already solved this problem.

This is MIT scientist Michael Hecht.

He developed this device called Moxie.

It is my favorite

In a sort of reverse fuel cell, it takes in the Martian atmosphere and gives out oxygen.

Recall that the atmosphere of Mars is 96% carbon dioxide, and oxygen makes up 78% of the carbon dioxide.

NASA's next rover to Mars will be in 2020, and it will have this device on board that will continue to produce enough oxygen for a human being.

But that's just a test, and the cool thing about this device is that it's designed to scale up to 100 times larger.

The next question is what to eat

We're going to grow crops using hydroponic methods, but until we have water on the surface of Mars that we can cultivate, we won't be able to provide more than 15 to 20 percent more food.

Until then, most of our food will come from Earth in dry form.

next place to live

At first, you're probably going to use an inflatable building or a lander.

but this is only during the day

Because the radiation from the sun and cosmic rays is too strong

you have to go underground

It turns out that Martian soil is generally good for making bricks.

This is also what NASA figured out.

If you add plastic to the bricks and put them in the microwave, you'll be able to build thick-walled buildings.

Or you can live in caves and lava tubes, which are abundant underground.

what to wear at the end

On Earth, the atmosphere, which is layered for miles above our heads, is constantly pushing one atmosphere of pressure on our bodies, and our bodies are pushing back against us.

Mars has almost no atmospheric pressure.

Dava Newman, an MIT scientist, created this cool spacesuit.

It envelops the body, shields it from radiation and keeps it warm.

let's think

Food, housing, clothing, water, oxygen...

Feasible

Really

It's still difficult and inconvenient

The next step for a comfortable life on Mars is a very big step.

It's terraforming, reshaping entire planets to make them look like Earth.

This may sound pretentious, but all the technology that can do what I'm talking about already exists.

must be warmed up first

Mars is a very cold place because of its thin atmosphere.

And here's the key to that: the poles of Mars are covered in large amounts of frozen carbon dioxide, which is dry ice.

If you heat it up, the dry ice sublimates directly into the atmosphere, thickening it, just like it does on Earth.

As you know, carbon dioxide has a high greenhouse effect.

My recommendation is to raise a very large solar sail, turn it into a mirror, and focus it first on the South Pole.

As Mars rotates, all of the dry ice heats up, sublimates, and is released into the atmosphere.

It doesn't take long for Mars to start warming up, maybe in 20 years.

Now, in our equatorial location, temperatures can actually reach 20 degrees Celsius on good days in the middle of summer, and drop to -70 degrees Celsius at night.

(Laughter) What we're trying to do here is runaway greenhouse effect, and if it warms up enough, the ice on Mars, especially underground, will start to melt.

Then the real magic happens

When the atmosphere gets thicker, everything starts to move for the better.

It becomes more protected from radiation, it gets warmer, and the warmer it gets, the more water can flow and the more it can be cultivated.

Then more water evaporates into the atmosphere, increasing the greenhouse effect.

It will start raining and snowing on Mars

As the atmosphere thickens, it creates enough atmospheric pressure to keep us out of spacesuits.

Atmospheric pressure necessary for human life is about 1/3 atmosphere

Eventually Mars will be a place like British Columbia, Canada.

There remains the difficult problem of making the atmosphere breathable, which may take a thousand years.

But humans are amazingly smart and extremely adaptable.

I don't know what the technology of the future will make possible.I don't know what the human body will be able to do.

Today's biology is allowing us to control a lot of things, our own genes, what our genes do in our bodies, and ultimately, human evolution.

Someday, humans living on Earth may be a little different than humans living on Mars.

But what will you do on Mars? how do you live

will be no different from the earth

Some people start restaurants, some people build steel mills.

Maybe someone will make a documentary about Mars and sell it on Earth.

Some idiot might even start a reality TV show.

(Laughter) You've got software companies, you've got hotels, you've got bars.

What is certain is that it will be the most impactful event of our time, and it will be extremely exciting.

Ask any 10-year-old girl if she wants to go to Mars.

Elementary school students today would choose to live on Mars.

Remember when humans first set foot on the moon?

People used to look at each other and say, "If you can do this, you can do anything!"

What will people think when Mars starts being colonized?

Most importantly, it will make humans a cosmic species.

What that means is that no matter what happens to Earth, humans will live on.

we won't be the last of mankind

thank you

(applause)

I will tell you the story of a wonderful woman

my name is davinia

Born in Jamaica, Davinia moved to the United States when she was 18 and now lives in the suburbs of Washington, D.C.

As a member of a political organization, I'm not in power, I'm not a lobbyist.

She'd say she's just an ordinary person, but she's getting really extraordinary results.

What's amazing about Davinia is that every week, she takes time out to think about other people, people who aren't next door to her, who don't live in the same state or even the same country, for strangers she'll never meet.

Davinia came to the fore a few years ago when she asked all her Facebook friends to donate pennies to help educate girls.

I didn't expect a huge reaction, but so far, we've collected over 700,000 pennies and sent 120 girls to school.

When I spoke to him last week, he said he was a little bit stalked by his local bank because he always brought a shopping cart full of pennies.

But people like Davinia aren't rare.

there are many

part of a growing movement

There's a name for people like her, they're "global citizens."

A global citizen is someone who sees themselves as part of humanity first and foremost as part of a state, tribe, or nation, and is willing to act on this belief to tackle the world's greatest challenges.

The mission of our organization is to discover, support and activate global citizens.

Global citizens exist in every country and in every class of people.

My aim today is to help you understand that the future of our planet depends on our citizens.

I believe that with more global citizens active in the world, we can solve all the major problems facing humanity -- from poverty to climate change to gender inequality.

These problems are, after all, global problems, and the only ones that can ultimately be solved are global citizens who demand global solutions from their leaders.

Now, some people's immediate reaction to this idea is that it's a bit unrealistic, or a dangerous idea.

So I'd like to tell you a little bit about myself, how I got to where I am, and how it's connected to Davinia and hopefully to you all.

Growing up in Melbourne, Australia, I was a regular, very annoying kid, always asking "why?"

Some of you may remember

I used to ask my mother the most frustrating question ever.

For example, "Hey mom, why can't you dress up and play with dolls all day?"

"Why would you order that with potatoes?"

"What is shrimp? Why do you put it on Barbie?"

(Laughs) "Also, Mom, this hairstyle—

Why is this happening? ! ”

(Laughter) It's the worst hairstyle on the planet.

Worst thing I've ever seen

I used to be a "why why boy", and I thought that the world could be changed, and I never gave up.

When I was 12, in the seventh grade, I started fundraising for people in the developing world.

We all worked really hard and raised more money than any other school in Australia.

As a reward, I was allowed to go on an inspection trip to the Philippines.

It was 1998

I was taken to a slum area on the outskirts of Manila.

There, I befriended Sunny Boy, who lived in a veritable garbage heap.

It was called "Smoking Mountain"

It's just a fancy name It's nothing more than a stinking dumpster Children like Sunny Boy spent hours and hours of restless rummaging around looking for something of little value

The nights I spent with Sunny Boy and his family shaped my life. When it came time to go to bed, on a concrete floor that was half the size of my room, me, Sunny Boy, and the rest of his family lay down, seven in a row, smelling of garbage and cockroaches crawling around.

I couldn't sleep, I just lay there thinking, "Why are there people who are forced to live like this, unlike me?

Why is Sunny Boy's dream-fulfilling power determined by where he was born, or what Warren Buffett calls the "birth lottery"? I couldn't be convinced, and I felt compelled to find an answer.

Only later did I realize that the poverty I saw in the Philippines was the result of decisions that people made or didn't make, that it was man-made, the result of successive colonial occupations and corrupt governments' fundamental disregard for the well-being of children like Sunny Boy.

Even if you're not the person who made "Smoky Mountain", you're the same person who made it.

If you want to help a kid like Sunny Boy, it's not just about donating a few bucks or cleaning up the dump where he lives, because that's not the heart of the problem.

After that, I got involved in community development projects, building schools, training teachers, working on HIV and AIDS, and what I learned was that community development should be led by the communities themselves. Charity is necessary, but not enough.

We must tackle these challenges head-on and radically on a global scale.

I realized that the best thing I could do was to gather a large group of citizens that I could mobilize and ask world leaders to implement radical change.

This inspired me, a few years later, with a group of college friends to try to bring the Make Poverty Past movement to Australia.

So what we had in mind was a small concert, and we were going to bring together artists from all over the country, just in time for the G20.

As you can see, I was a little bit excited about the day.

(Laughter) But what surprised me was that the Australian government listened to our voices and agreed to double the global health and development budget, an increase of $6.2 billion.

And that's when -- (Applause) I felt incredibly validated.

By uniting citizens, they persuaded governments to commit to action to solve problems far beyond their imagination, far from home.

But— this didn't last long.

Something changed in the government, and six years later, all this new budget was gone.

The lesson here is—

One big success is not enough

Sustainable Movements—We need movements that are unaffected by the fickle moods of politicians and signs of economic slowdown.

And it has to happen all over the world, because otherwise every government will always have the excuses they have to say that they can't handle a global effort on their own.

So we made it our goal

As I set out, I asked myself: How do we create enough forces to win the long game, and how do we mobilize broadly?

I could only come up with one way

Somehow transforming the fleeting enthusiasm of those involved in the Make Poverty Past campaign into a lasting passion—

make it part of your identity

So in 2012, we created an organization with this goal in mind.

I could only think of one name, "Global Citizen."

I'm not just talking about one organization.

Citizen action is the focus

Survey data shows that only 18% of people who care about the world's problems have taken action.

It's not that I don't want to act

Rather, they believe they don't know how to do it, or that their actions won't change anything.

But somehow, we had to reach out to millions of citizens in dozens of countries, to persuade them to act, to pressure their leaders to act altruistically.

While I was working, I was thrilled to learn that if you set a mission to be a global citizen, you'll suddenly find yourself in a position of great ally.

Extreme poverty isn't the only inherently global problem.

So is climate change, so is human rights, gender inequality, even conflict.

I've come to work side by side with people who are passionate about these interrelated issues.

But how did we actually find and move so many global citizens?

I used a universal language, it's music.

We held a Global Citizen Festival in Central Park, in the heart of New York City, and invited some of the world's greatest artists to perform.

We planned to coincide with the UN General Assembly so that the leaders whose voices we wanted to hear couldn't be ignored.

I made a trick here, making the ticket not for sale

I made a condition to obtain it.

The condition is that you take action on the world's problems, and only then can you collect enough points to qualify for admission.

Anything related to the movement pays for the ticket.

It didn't matter that just being a global citizen made me feel good.

For me, global citizenship and action are one, and I wanted that from people as well.

how this worked

Last year, just in the New York area, 155,000 citizens earned enough points to enter.

Citizens of 150 countries around the world are now members

Last year, over 100,000 new members joined every week throughout the year.

There's no need to create a new global citizen from scratch.

already around the world

You just organize it, you give it a trigger, and you take action.

There's a lot to learn here from Davinia, who started her global citizenship journey in 2012.

what she did

it's not difficult

Write a letter or send an email to a politician's office

I also started volunteering in the community.

And then I became very active on social media, and I started collecting pennies, lots of pennies.

this may not sound like a big deal

so what can be achieved

A lot was actually accomplished because of the collaborators.

Her actions enlisted 142,000 global citizens to double the US government's investment in the Global Partnership for Education.

Director General of the Agency for International Development, Dr. Rajiv Shah, making that announcement.

When thousands of global citizens inspire each other, they collectively create an amazing force.

Global citizens like Davinia helped move the World Bank to increase investment in water and sanitation.

This is President Kim at the festival announcing a $15 billion investment, and India's Prime Minister Modi has also pledged to install toilets in every home and school across the country by 2019.

Global citizens, prompted by late-night show host Stephen Colbert, launched a Twitter attack on Norway.

Norwegian Prime Minister Erna Solberg took this message and pledged to double investment in girls' education around the world.

Global citizens, along with Rotary clubs, have called on the governments of Canada, the United Kingdom, and Australia to increase funding for polio eradication.

The three governments jointly pledged $665 million.

But while we've made it this far, we're also facing some pretty big challenges.

In your mind, you might think that it's impossible to convince governments to keep their eyes on the world's problems.

Indeed, in the words of the late American political giant Tip O'Neill, "Politics is always local."

The key to a politician's election is always this: to aim for power and hold it in your hands, the key is to pursue the interests of local residents and, at the broadest scale, the nation.

The first time I realized this was when I was 21.

I had the opportunity to meet with a man who was Australia's Minister of Foreign Affairs at the time, and I'm not going to mention his name, but -- [Alexander Downer] (Laughter) -- privately, and he was very passionate about ending poverty in the world.

“This is a once-in-a-lifetime opportunity for Australia to be a driving force behind the achievement of the Millennium Development Goals.

Let's do it"

Then the minister fell silent for a moment and turned his cold, condescending eyes toward me, "Hey you, no one thinks about foreign aid as much as snot."

It's not really that elegant of a way to say it.

and the minister

I continued to worry about my relatives, my domestic problems first.

This is, in my opinion, an outdated and dangerous way of thinking.

In the words of my late grandfather, "a liar."

Parochial regionalism brings about this black-and-white thinking, pitting the poor in one country against the poor in another.

pretend to separate themselves and their country from other countries

But isn't the whole world our family, and if we ignore it, we're dangerous to ourselves.

Do you remember what happened when you ignored Rwanda? What happened when you ignored Syria and climate change?

Governments should care less than boogers, because climate change and extreme poverty will take their toll on us.

global citizens understand this

Now is a good time to be a global citizen, it's a time when everyone's voice is heard.

Remember the Millennium Development Goals set in 2000?

At the time, all we could do was send out letters and wait for the next election.

There was no SNS

Today, billions of citizens have more tools than ever before, more information at their fingertips, and more influence than ever before.

We have problems to solve and tools to use.

The world has changed, and history will show that those who can see beyond borders are right.

Now as for the situation

We've put on the best festivals, won big in policy battles, and more and more citizens from all over the world are joining us.

Mission accomplished?

not yet

still a long way to go

But I see this as an opportunity

The concept of global citizenship, while self-evident in theory, has in the past been unrealistic in many ways, but now it overlaps with this special time in which we are fortunate enough to live.

As global citizens, we have a unique opportunity to be the driving force behind major changes happening around the world.

In the months and years from now, global citizens will hold world leaders accountable and ensure that the new Sustainable Development Goals are managed and implemented.

Global citizens will partner with the world's leading NGOs to eradicate epidemics like polio and malaria.

Global citizens will join us from all over the world, increasing the frequency, quality and influence of our actions.

I'm so close to achieving the dream I just spoke of.

Imagine a horde of millions, swells to tens of millions, connecting, communicating, and acting, and not accepting no as an answer.

Now, in the midst of all this work, I've been trying to reunite with Sunny Boy.

but i haven't been contacted yet

We met long before social media existed, and his address had been moved by the local authorities, which is common in slums.

Wherever he is now, I would love to meet him and talk to him if possible.

It's because of him and so many others that I've learned how important it is to be part of a people's movement, young people who look up from the screen and go out -- a movement for global citizenship.

Global citizens are people who come together to ask "why?" and who respond to the incredible potential of the world we share, against those who deny it.

i am a global citizen

what about you?

thank you

(applause)

[April 3, 2016 The largest data breach in history occurred] [The 'Panama Papers' exposed the wealthy and powerful] [too much money hidden offshore] [What does this mean? ] [I asked Global Witness's Robert Palmer] There's been a ton of headlines this week from the leak of 11 million documents from Panama-based law firm Mossack Fonseca.

These leaked documents from Panama have revealed just a small part of what the secretive offshore world looks like.

And what we've discovered is that clients like banks and lawyers are asking companies like Mossack Fonseca, "I want an anonymous company, please make one."

You can read the contents of the actual exchanged emails and understand how it works and how it is operated.

The ripples of this leak have already begun to spread all at once.

Iceland's prime minister resigns

Other collaborators of the brutal Syrian dictator, President Bashar al-Assad, also reportedly have offshore entities.

There's also a $2 billion financial stream that has surfaced, which leads to Russian President Vladimir Putin and involves the president's childhood friend and best friend, a world-famous cellist.

I'm sure there are still many rich people around the world who are freaking out over another wave of news and another leak of documents.

This sounds like a spy novel or a John Grisham courtroom plot.

To ordinary people like you and me, it seems far-fetched.

It may seem irrelevant

But the truth is that when the rich and powerful are able to stash money offshore and avoid paying taxes, that means they're not getting money for critical public services like health care, education, and roads.

it affects us all

For my organization, Global Witness, this revelation has been tremendous news.

Now, the world's media and political leaders are talking about individuals hiding assets through offshore secret jurisdictions, and this is what my organization has been telling and exposing for 10 years.

Now, I'm sure many of you are finding it hard to understand, hard to understand how this offshore world works.

Think of the Russian matryoshka doll.

One company is inside another company, and that company is inside another company, and it becomes almost impossible to figure out who's really hiding behind that structure.

It makes it very difficult for law enforcement, tax authorities, journalists and civil society to understand what's really going on.

Also, interestingly, the US has less coverage of this incident than other countries.

That's probably because no key American figure has yet surfaced in this revelation, or scandal.

Not because there are no wealthy Americans hiding money offshore.

Mossack Fonseca just doesn't have many American clients because of how offshore trading works.

If the information came from the Cayman Islands, or Delaware, or Wyoming, or Nevada, there would be more cases and instances involving Americans.

In fact, some states in the United States require less information to create a company than it takes to create a library card.

Because of the secrecy that exists in America, school district officials embezzle money for students.

There is a lot of fraudulent practices that defraud trustworthy investors out of money.

It's an act that concerns us all.

What is the reality of offshore trading at Global Witness?

i wanted to know how it works

So we sent undercover investigators to 13 law firms in Manhattan.

The investigators pretended to be African envoys who were planning to move suspicious money to the United States and buy houses, yachts and planes.

To our great shock, all but one of the law firms we investigated, all but one, suggested to our investigators this suspicious way of moving money.

It's all about the initial consultation. No deals were made with any of the law firms, no money was moved, but the problem with the system was uncovered.

Another important thing is not to think of this as just an isolated incident.

And it's not just the individual law firms that advised our undercover investigators.

It's not just about certain big-time politicians who are in the midst of scandals right now.

The system itself is a problem because it's a breeding ground for corruption, tax avoidance, poverty and political instability.

To tackle this problem, we need to change the game itself.

We need to change the rules of the game to make it harder to cheat.

Things may seem grim and hopeless, like there's nothing you can do, or that nothing has changed, or that the rich and powerful will never go away.

But from an optimistic perspective, it looks like change is definitely starting to happen.

Over the past few years, there's been a big move towards transparency about company ownership.

British Prime Minister David Cameron announced at the G8 summit in Northern Ireland in 2013 that he would integrate policies to address this problem.

Since then, the European Union has a policy of identifying the true owners and controllers of companies across Europe at national central registry offices.

Unfortunately, the United States has lagged behind in these developments.

We have bipartisan bills in the Senate and House, but they're not making the progress we'd like.

So I hope that the glimpse into the offshore world from the Panama Papers leaks will inspire more disclosure in the United States and around the world.

We at Global Witness believe that now is the time to make a difference.

The public should be outraged. They should be outraged by those who hide their identities behind anonymous companies.

Business leaders should stand up and state that this kind of secrecy is not in business.

Political leaders should face this issue and pledge to change the law to open up secrets.

Together, we can put an end to the secrecy that now allows tax avoidance, corruption, money laundering, and more.

I've spent the last 38 years trying to keep a low profile.

proofreading job

We do it in "The New Yorker." The editorial role of the New Yorker is like defending the shortstop in the major leagues.

Mind you, it's not my job to decide what to put in the magazine.

The proofreading work is done at the sentence level, looking at paragraphs, looking at words and punctuation.

It's my job to see the details.

For example, a two-dot symbol above the "i" for "naïve."

It is the role of penetrating the company's style in the magazine

Every publisher has its own style.

The style of "The New Yorker" is particularly unique.

It can even be the seed of teasing

For example, we still write "teen-ager" with a hyphen as if it was a newly coined word.

If you see "teen-age" with a hyphen or "cooperate" with two dots, you know it's from The New Yorker.

Our proofreading work is mechanical work.

In relation to proofreading, there is also a role of "questioning" and "OK"

Editing is a mechanical job, but questioning is an interpretive job.

The editor makes suggestions to the author, adjusting the strength of a sentence, pointing out unintentional duplication, or suggesting a more appealing wording.

The purpose is to protect my face

However, instead of handing the vermillion proofs directly to the author, they are handed to the editor.

This creates a sort of "carrot and stick" division of labor, where the editor, in the broadest sense, is invariably responsible for wielding the "stick."

If things go well, reviewers can stay hidden, but as soon as they make mistakes, they become painfully visible.

For example, the most recent typographical error that a reader reproached is this

"Last Tuesday, pre-Trump Republican populist—no-nothingism incarnate Sarah Palin endorses Trump." Readers say, "What is the New Yorker's famed editorial department doing?

It's a mistake of know-nothingism."

I have done

There is no excuse for such mistakes

But I like the word "nihilist"

Maybe it's a dialect meaning "nihilism"

(Laughter) Another reader pulled a line from the magazine, saying, "Ruby was 76 years old, but she stood firm. Only her wobbly steps convinced her of old age." About this sentence, "I'm sure there are people inside the New Yorker who know what 'belie' means. It's the exact opposite."

Stay strong! ”

rather than “belie” (which gives the impression of being contrary to fact)

It should have been "betray"

E.B. White once described the magazine's use of commas as "precisely comparable to throwing knives around the body."

(Laughter) You're right. I get a lot of complaints about commas.

"Are there really two commas in 'Martin Luther King Jr. Street'?"

It's different from the label, but the style of this magazine is to add a comma to "Jr."

There was also a funny letter, saying, "I beg you, please fire the comma maniacs of your company's editorial department, or if that's not possible, restrain them."

It's a pretty good use of commas, but the space between "maniac" and "on" is superfluous.

(Laughter) Also, if you want to put a comma around "at least," use a dash and rewrite it like this: "— or, at least, restrain —" Perfect!

(Applause) And then someone said, "I'm a big fan of your magazine, and I'm a big fan of yours.

[2.5 million... 385 million...] Impossible.

(Laughter) Just one more note from a spelling-obsessed reader: "You don't write 'cord' in 'vocal cords' as 'chord'."

Outrageous! ”

(laughs) I used to look forward to hearing from readers.

Now, there is a contract between the author and the editor.

The editor will defend the author's honor and will not speak publicly about bad jokes that are rejected or articles that are cut because they are too long.

A good editor is the one who forestalls the author's excesses.

Reviewers also have a rule: don't divulge what they're reviewing.

It would be a betrayal to throw out examples of misuse here, so let's talk about an example that works.

For some reason I'm known for my rigor

Some reporters know how to get around my proofreading.

Ian Frazier, aka Sandy, has been my colleague since the early '80s.

You're one of my favorite journalists, but sometimes you write things that confuse reviewers.

I wrote an article about Staten Island after Hurricane Sandy, saying, "One pier was half swept down the middle and the other half slanted toward the water, with struts and wires sticking out of it, like when you open a box of linguine and the contents slide out."

I can't help it

Strictly speaking, "like" should be "as", but that sounds ridiculous, as if you're trying to use an extension of the Homeric simile: "It's time to open a box of linguine."

(Laughter) I decided to interpret the damage from the hurricane as conveniently affecting the text, so I left it as is.

(Laughter) Usually, when I think something's wrong, I refer the author up to three times.

When I inadvertently leaked this to Sandy a while ago, he replied, "Only three times?"

I've become obsessed with proofreading.

There's an article that recently appeared in the "Rumors of the City" section -- this is the section at the front of the magazine -- and it's about everything from magician Ricky Jay showing his collection at the Metropolitan Museum of Art to the beginning of the doggy bag in France.

Sandy's article was about Supreme Court Justice Sonia Sotomayor's homecoming to the Bronx.

Three things struck me about this article.

The first point is grammar

Of the judge's black attire, he wrote, "The judge's face and hands stood out like an old, dark painting."

So "like" becomes a preposition, and a preposition must have an object, and the object is a noun.

This "like" must be "as"

"It stood out as if it were in an old, dark painting."

The second point is the spelling problem.

Here's the part that refers to the judge's assistant saying, "Wait a minute.

I have the judge on the mic." "mic'ed"?

In the music industry, a microphone is spelled "mic" because it says so on the device.

I've never seen an example of this spelling being used as a verb, and the thought of "mic'ed" passing under my watch drove me crazy.

(Laughter) The abbreviation for "microphone" in this magazine is "mike."

Finally, grammatically and linguistically, one nasty problem remains: pronouns must agree with the preceding word in singular and plural.

“Everyone in the vicinity held their breath” “their” is plural, but the preceding “everyone” is singular

Never say "Everyone were there"

Because "was" or "is" is singular

I watch “Everyone held their breath” often

To give some validity to this terminology, our reviewers call it "their singular."

(Laughter) When I find these examples, it's my job to do my best to remove them.

However, "their" cannot be "her", neither "his" nor "his or her" is inappropriate.

because it doesn't fit the context

So, through my editor, I proposed the following alternative to the author: "All in the vicinity held their breath."

rejected

Re-challenge with “All those present held their breath”

Somehow the atmosphere of the trial comes out

However, the editor told me that "present" and "presence" cannot be used in the same sentence.

When the final draft came, I changed "like" to "as" and "mic'ed" to "miked" as suggested.

"Everyone held their breath" remained

If 2 out of 3 are successful, that's fine.

In the same issue, a French doggy bag article showed a French man using swear words starting with the letter "F" out of necessity.

Which article has the most complaints when you receive feedback from readers?

(laughs) Thank you very much.

(applause)

How does news shape the way we see the world?

See the world map here. based on continental area

And here's what Americans are seeing because of the news

This map shows the number of seconds that American networks and cable news organizations spent reporting stories about each country in February of 2007, exactly one year ago.

This February is the month when North Korea agreed to dismantle its nuclear facilities.

There was a great flood in Indonesia

In Paris, IPCC publishes research paper confirming human impact on global warming

US news accounted for 79% of total coverage time

And if you look at the remaining 21%, excluding the United States, Iraq looks good. It's that big cat. can't see well after

For example, Russia, China and India only fill 1% of coverage time.

After analyzing all the news articles and removing just one, the world looks like this

What is that article? Death of Anna Nicole Smith

This article surpassed all countries except Iraq, and it was 10 times the coverage time of an IPCC paper publication.

But that's not all. As you all know, Britney has a big presence these days.

So why not hear more about world events?

One reason is that news stations have cut the number of foreign bureaus by half.

Other than ABC's one-employee mini-bureaus in Nairobi, New Delhi, Mumbai, you won't find news bureaus anywhere in Africa, India, South America, where more than 2 billion people live.

The fact is, Britney's coverage is much cheaper

And when I look at where people get their news, the lack of foreign coverage is even more disturbing.

Mainly news from local TV stations, and unfortunately only 12% of the air time is from abroad.

But what about the Internet?

Recent popular sites are not so good

Last year, the Pew Trust and Columbia J School analyzed 14,000 articles on the Google front page.

They were articles about the same 24 events!

In addition, e-content research demonstrates that much of the global news published by US news editors is a repeated use of AP and Reuters news agencies, and is not explained in a solid context in the context of making it easy to understand.

In short, it could be a clue as to why today's college graduates, as well as less educated Americans, don't understand the world as much as their counterparts did 20 years ago.

If you think it's because we just don't care, you're wrong.

The number of Americans claiming to follow world news has increased by more than 50% in recent years

The real question is: In our increasingly interconnected world, is this distorted worldview what we Americans want most?

i believe i can do better

Also, can you afford not to do it? thank you

There's another reason we need optimism: climate change.

Believe it or not, let me tell you the truth.

On December 12th, 2015, in Paris, 195 governments met in the name of the United Nations -- and if you've ever been in government, you know how difficult it is -- 195 governments unanimously adopted a vision to change the course of the global economy, protect the most vulnerable and raise the standard of living for all of humanity.

I'd say it's a great achievement

(Applause) But this achievement is even more impressive when you consider what happened just a few years ago.

2009 Copenhagen Conference

Anyone remember?

At the time, after years of trying to reach an agreement on climate change, the same governments convened in Copenhagen, but the results were dismal.

Why?

There are many reasons for this, but mostly it's because of the world's ingrained divide between the North and South worlds.

Six months after this failure, I was appointed to lead the negotiations on global climate change.

There's no better time to start a new job, right?

The world's awareness of climate change has been terrible.

No one believed that one day international agreements would be possible.

In fact, I was one of them.

If you can promise not to share it outside of the wonderful space of TED, I'm going to reveal a secret that fortunately didn't make it into history.

At my first press conference since taking office, I was asked the question, "Do you think it's possible for Secretary-General Figueres to reach a global agreement in the future?"

Then I blurted out, "I can't do it in my lifetime."

You can imagine the strained faces on the public relations team's faces, horrified by this crazy Costa Rican new female boss.

I was scared too

Not to myself, I'm used to myself

What scared me was the seriousness of what was to come as a result of what I just said to the world that all of our children had to live in.

It was honestly the worst moment for me. I thought

The word "impossible" doesn't refer to a fact, it's an attitude of the speaker.

it's just an attitude

I decided, then and there, to change my attitude -- to help change the world's attitude to climate change.

A little bit here — is this it? thank you-

Imagine if you were told your job was to save the planet, what would you do?

Add it to your job responsibilities

In this job, I have full responsibility, but no authority, because every decision is left to the government.

What would you do? I would love to know what you do on your first Monday at work. I — panicked

(Laughter) After taking a breather, I was still distraught, because I realized that I had no idea how to solve this problem.

But I also realized that although I have no idea what the solution is, I do know one thing: we need to change the tone of the discourse on climate change.

Because without optimism, you'll never win.

I'm just calling it "optimism" here, but let's take the term in a broader sense.

The word implied courage, hope, trust, solidarity. Add to your interpretation of optimism a fundamental belief that it is possible to unite and help one another to change the destiny of mankind.

Without this interpretation, I thought, I would never be able to get out of the stalemate that happened in Copenhagen.

For the next six years, I stubbornly and stubbornly injected optimism into the system, no matter what questions the press asked -- my question-and-answer sessions got better -- no matter how much the opposite was proven.

That's because there's already a lot of pessimistic evidence.

Still, he continued to preach optimism.

And soon, I started to see changes in many areas, thanks to the efforts of thousands of people, many of whom are here in this room.

I'm sure you guys at TED have seen some pretty dramatic changes -- I'm sure you can guess what the first realm is.

it's technology

Clean technologies, especially renewable energy technologies, have become more affordable and more accessible, which is why they are already being built today — solar power plants have the power to power entire cities.

Because of this advance in technology, there's one thing that we're beginning to understand is that the economic equation has changed, because our perceptions have changed. Yes, climate change has enormous costs, and yes, the risks are amplified.

There are also economic benefits and intrinsic benefits, because the spread of clean technology means cleaner air -- healthier people, better transportation, more livable cities, better electricity availability, and higher penetration of electricity in the developing world.

All in all, it's going to be a better world than it is today.

Now that you understand this -- and I'm sure some of you are involved -- you've seen the ingenuity and excitement unfolding, starting with local governments, then the private sector, industry leaders, insurance companies, investors, city leaders, religious circles, and so on.

Because we started to see that it was a good initiative for us, too.

This enthusiasm has spread to even the most unexpected people.

For example, the CEO of a giant oil and gas company came to see me early last year, and he said, informally, of course, that he said, "I still don't know how I can change our company, but I've decided to change it. I think it's important to take a long-term view of the business."

And so the economic equation changed, and what followed was widespread support around the world, and governments soon woke up to the realization that climate change mattered to their countries.

And when we asked countries how they could contribute to global efforts based on their national interests, 189 out of 195 countries sent us climate change plans based on their national interests, aligned with their priorities, and consistent with their sustainable development plans.

Now -- it's only when countries are able to defend their core national interests that they're ready to align themselves on a common path. It's probably going to take decades, but it's going to be decades before we have a new economy -- a carbon-free, resilient economy.

Measuring, reporting and demonstrating national efforts is legally binding

The metrics that we'll use to track collective progress toward this goal every five years are also legally binding, and the journey from carbon fuels to building a more resilient economy is also legally binding.

And here's the big part, until now

Only a handful of countries followed up on very few short-term emissions reduction commitments, which were not only totally inadequate, but were largely perceived as a burden.

From now on

Every country in the world, to varying degrees, and with different approaches for different industries, will all contribute towards a common goal, protect the global environment, and move forward boldly.

Once all of this came together and everyone changed their minds, governments were able to go to Paris and adopt the Paris Agreement.

(Applause) Now, looking back -- in the last six years -- the first thing that comes to my mind is the day the Paris Agreement was adopted.

Words cannot express the joy that filled the place

5,000 people jumped out of their seats, crying, clapping, screaming, yelling, a mixture of jubilation and incredible disbelief, because what so many people had been working for so many years had finally become a reality.

Change is happening outside of the people directly involved.

A few weeks ago, a colleague selected Tahitian pearls as a gift for his beloved wife.

When I finally decided to buy it, the clerk said, "Buy it now. You're doing the right thing. Because of climate change, these pearls may soon become extinct."

The clerk continued, "But did you know that a recent intergovernmental decision might save it from extinction?"

What a wonderful testimony, maybe maybe hope -- testimony that there's still a chance.

I'm the only one who knows there's a lot of work ahead.

The fight against climate change is just beginning

In fact, we must definitely double our efforts, especially over the next five years, because it's a critical five years.

But over the past six years, what was initially impossible has now become unstoppable.

Optimism has made this possible, and optimism has transformed conflict into cooperation, and the realization that national and regional interests and global needs are not necessarily mutually exclusive, and that understanding them can bring them together and harmoniously unite them.

Looking ahead, when we think about the other global problems that we need to pay attention to this century, the food problem, the water problem, the housing problem, the forced migration, the one thing that is certain is that we still don't know how to solve these problems.

But we can look to what we've done with climate change, and the zero-sum thinking that if someone wins, someone else loses.

You will realize that you have to change the win-lose mindset that humanity has been indoctrinated to.

In a world where the planet has been exhausted to its limits by us, and where people are becoming less connected and yet becoming more interdependent, it's no longer someone's loss that's someone else's gain.

Either we're all losers — or we're all winners

But it's up to us whether we choose to win together or lose together.

You have to decide if you lose everyone's gains, or if you join forces to live together and gain the gains.

I've done it once, so I should be able to do it again

thank you

(applause)

(Prelude) (Amanda Palmer) Ground control to Major Tom Ground control to Major Tom Please take your protein pills and put your helmet on.

(Al Gore) 10, 9, 8, 7, 6...

(Palmer) Ground control to Major Tom (Gore) 5, 4, 3, 2, 1 ･･･ (Palmer) Start countdown Start engines

Ignition confirmation May God's love be with you

(gore) firing

(Palmer) From ground control to Major Tom, you've hit your target, and the press wants to know where your shirt is.

It's time to go overboard, if you're ready

"Major Tom to ground control I'm about to walk out the door I'm floating in a very strange way The stars look so different today

floating around my tin can

Far above the world The earth is blue There's nothing I can do

(Interlude) "It's past 100,000 miles, but it's very calm. The ship seems to know where it's going.

Tell my wife I love her, she knows

Ground control to Major Tom There's something wrong with the line.

Can you hear me, Major Tom?

Can you hear me, Major Tom?

Can you hear me, Major Tom?

hear...

"Around my tin can Far above the moon

the earth is blue there's nothing i can do

(Interlude) I'm not a seer, I'm not a Stone Age man—I'm just a man living with the potential to be superhuman.

— David Bowie (1947-2016) (applause)

I will be 44 next month, and I feel that 44 is going to be a very good year.

This hunch doesn't come from anything in particular, it's because I read it in a book in good years, written by Norman Mailer in 1968.

"He realized his age at 44."

A line from Mailer's Army of the Night: "It was as if the bones, the muscles, the heart, the mind, the emotions that made me a human being were materialized. I felt like I had reached that stage."

Of course it wasn't about me

You and I, and the protagonist of The Army of the Night, all of us grow older fairly in sync and go through the same epic transformation that begins at birth. Childhood, when everything is new but shackled.

There are patterns in life, and they are common to all.

In the words of Thomas Mann, "As it happens to men, it happens to me."

People don't just live according to patterns

I will keep it in my records

Writing it down in a book creates a story that will be read later and made known to the world.

Books tell us about our past, present and future.

this has been going on for thousands of years

In the words of James Salter, "If life turns into anything, it's the pages of a book."

So six years ago, it occurred to me that if life were to be the pages of a book, there must be something about every age somewhere.

If you find it, you might be able to build a story

I figured that if I patched it all together, it would be a single life, and I could create a picture of a long life of 100 years -- the years that the luckiest people would spend.

I was 37 years old at the time, "A reasonable age," wrote William Trevor.

I used to spend a lot of time thinking about the passage of time and age.

I knew long ago, from having sick family members and having injuries myself, that we don't always get old.

And living longer only postpones the inevitable death, and meanwhile only sees those who have hastened to live—

The thought of that made me feel depressed

But if you make a list, it will be preserved for posterity.

By chronicling the fleeting and fragile years of our lives, we are able to grasp and hold on to what has passed, giving us a glimpse into the future, whether we live to that age or not.

I quickly fell in love with making lists, and spent years and years reading book after book.

So we got all the ages up to 100 years old.

"Age 27, the age of sudden revelation" "Age 62, the age of slight regression"

Of course, we knew that these insights were relative.

First, because we live longer, we age more slowly than in the past.

Christopher Isherwood used the term "dead leaf" to describe the age of 53, and just a century earlier, Byron had used the same term to describe himself at 36.

(Laughter) I also knew that life can take big, unexpected turns, that one year can be very different from the previous, and that people of the same age experience things differently.

However, when each age group is complete, my life up to that point has been seen in a book, as if it were reflected in a mirror. 20 years old is "the age when you become more and more confused about who you are" 30 years old is "the age when you get out of the idle preparation period until then and your life becomes active" 40 years old is "the age when you quietly close the door and realize there is no going back."

was exactly me

Of course it applies to everyone.

Graphic design maestro Milton Glaser, who created these beautiful visuals, is now 85 years old, or, in Nabokov's words, "ripened and at the peak." Glaser says that, like art and color, literature can be used to remember human experiences.

In fact, I was nodding as if I could show my grandfather the list I made up and he'd understand.

My grandfather was 95 years old at the time, and death was close at hand, but it was also, in the words of Roberto Bolaño, "the same thing as immortality."

At the time, my grandfather said, "At 22, you don't feel like you're going to die," Proust said, but it's also true that the thanatologist Edwin Schneidmann said, "At 90, you'll definitely feel like you're going to die."

As it happens to me as it happens to others, it happened to my grandfather too.

The list is complete, 100 years is done.

Looking back, I realized that I still have a long way to go—

That there's still life ahead, so many pages left

With Mailer's words in my heart, I can't wait to turn 44.

thank you

(applause)

physiological

Blood

Menstruation

disgusting

secret

hidden things

Why?

It's a natural biological process that all girls and women experience every month for nearly half of their lives.

It's a very important phenomenon for human survival and prosperity.

but we think it's taboo

I feel embarrassed and embarrassed to bring it up

When I got my first period, I was told to keep it a secret, not even from my father or brother.

Later, when the item appeared in a textbook, the biology teacher skipped it.

(Laughter) Do you know what you've learned from this?

I know it's very embarrassing to talk about it

I learned to be ashamed of my body

I've learned that in order to be a proper person, you have to remain ignorant of your period.

In a study conducted in various parts of India, three out of 10 girls didn't know about their periods when they had their first period.

In parts of Rajasthan, even more nine out of ten people didn't know it.

You'd be surprised to know that most of the girls I've talked to didn't know about menstruation when they had their first period, and thought they had blood cancer and were going to die soon.

Menstrual hygiene is a very important risk factor for genital tract infections.

But in India, only 12 percent of girls and women are hygienic during their period.

If you do the math, 88 percent of girls and women are unsanitary during their period.

I was one of them

I grew up in a small town called Garwa in Jharkhand, where even buying sanitary pads is considered shameful.

So when my period started, I started using rags.

Washed and reused after each use

When I put it away, I hid it in a dark, damp place so that no one would know I was menstruating.

Repeated washing makes the rags rougher, which often leads to eczema and infections.

I used rags for five years before I moved out of that town.

Menstruation has created another problem, which is the social restrictions placed on girls and women during their period.

I'm sure you all know this, but for those of you who don't, I'd like to say

I wasn't allowed to touch or eat the pickles.

I wasn't allowed to sit on the couch or other family members' beds.

I had to wash my sheets every time after my period, even if it wasn't spotless.

Considered unclean, it was forbidden to worship or touch any object of religious significance.

Outside the temple, there is a sign that says ``Menstruating girls and women are not allowed to enter''.

Ironically, it was usually the older women in the household who imposed those restrictions on the girls.

In the end, they grew up accepting those constraints as normal.

Myths and misconceptions are passed on from generation to generation without any hindrance.

During my time working in this field, I've heard that menstruating girls separate from eating and washing dishes.

Some families were forbidden to bathe or even isolated from their families during their period.

About 85% of girls and women in India have one or more restrictions during their period each month.

Can you imagine the effect of all this on a girl's self-esteem and self-confidence?

Psychological trauma affects everything about personality, academic performance, and growing up in the early stages of personality development.

I religiously followed all these restrictive habits for 13 years until an argument with my partner Tuhin changed my perception of menstruation forever.

In 2009, Tuhin and I were in graduate school studying design.

The two fell in love, and it was easy to talk to him about menstruation.

Tuhin knew nothing about menstruation.

(Laughter) I was horrified to learn that I had terrible period cramps and that I was bleeding every month.

(laughs) Yes

Menstruating girls and women were horrified to learn that their families and society impose restrictions on them.

To ease my cramps, he went online to learn more about menstruation.

When I shared his information with him, I realized how ignorant I was about menstruation.

And it turns out that a lot of what I believed was actually fiction.

And then we thought, if we, the educated people, were so ignorant about menstruation, then millions of other girls would be ignorant, too.

I did some research, to better understand the problem, and I began a year-long investigation to study the ignorance and root causes of menstruation.

Ignorance and misunderstanding about menstruation is commonly held to be a rural phenomenon, but in doing research, I realized that it's also an urban phenomenon.

It's the same with the urban intellectual class.

After speaking with many parents and teachers, I've learned that many people actually want to educate girls about periods before they start their menstrual cycles.

But- they didn't have the right tools.

It's a taboo, so we hesitate and feel ashamed to talk about it.

Girls these days get their first period in the sixth and seventh grades, and our curriculum only teaches menstruation in the eighth and ninth grades.

Teachers still skip this item entirely because it's taboo.

That's why schools don't teach girls about periods, and their parents don't talk about it.

What do you do?

Twenty years ago and now, nothing has changed.

After talking to Tuhin about our findings, we thought, why not create something that would help girls understand menstruation on their own, something that would make it easier for their parents and teachers to talk to them about it?

In my research, I collected a lot of stories.

It's the story of a girl who is menstruating

It's the kind of story that sparks curiosity and curiosity as they chat about menstruation among their peers.

I was looking for that kind of story

We wanted girls to be interested and motivated to learn.

I've been meaning to use these stories when teaching menstruation.

So I decided to make a comic book, where cartoon characters tell stories about menstruation in a fun and engaging way.

I set up three characters to portray girls in different stages of puberty.

Pinky has not yet had her period Jiya has had her period in the story Mila has already had her period

The fourth character is Priya Didi.

Through her, girls learn about different aspects of growing up and menstrual hygiene.

During the making of the book, I took great care to ensure that each picture was never offensive and was culturally sensitive.

We tested the prototype and found that the girls liked the book.

They were engrossed in reading, learning more and more about periods on their own.

With this book, parents and teachers felt comfortable talking to girls about periods, and sometimes even boys wanted to read it.

(Laughter) (Applause) This comic book helped create an environment where menstruation is not taboo.

To educate girls, many volunteers have used it to conduct menstrual awareness workshops in five states in India.

One of our volunteers used this prototype to teach a young nun, and took it to a monastery in Ladakh.

I produced the final version of "Menstrupedia Comic" and published it last September.

So far, more than 4,000 girls have been educated with this book. (Applause) Thank you.

(Applause) India and 10 other countries.

We continue to work with local organizations to translate this book into foreign languages ​​so that it can be made available in various countries.

Fifteen schools in different parts of India have incorporated this book into their school curriculum to teach girls about menstruation.

(Applause) I'm heartened that volunteers, individuals, parents, teachers, school principals are working together to bring menstrual awareness into their communities, to make sure girls learn about periods at the right age, and to help break this taboo.

I dream of a future where menstruation is not a curse, not a disease, but a welcome change in a girl's life.

And from me -- (Applause) And finally, I have a little request for all the parents here.

Dear Parents, If you are ashamed of your periods, your daughters will be ashamed of their periods.

So be positive about your period

(laughs) Thank you very much.

(applause)

how to find a dinosaur

Impossible, right?

but it's not

The answer is thanks to a formula that every paleontologist uses.

I'm going to give you some tips

First, find rocks of the correct age.

Second, the rock is a sedimentary rock.

and that the sedimentary rock formations are naturally exposed.

That's all

If you go to places that have all three, you're more likely to find fossils.

Let's look at the formulas one by one

Each organism lives in a specific geological time period.

So you have to find rocks from the right time period according to your interests.

If you want to find trilobites, you have to find very, very old Paleozoic rocks -- rocks that are 500 million to 250 million years old.

But if you want to find dinosaurs, you can't find them by looking for Paleozoic rocks.

Dinosaurs haven't appeared yet

You have to look for younger Mesozoic rocks, and especially in the case of dinosaurs, rocks that are 235 million to 66 million years old.

As far as finding rocks of the correct age, it's fairly easy, because everywhere on Earth is geologically mapped to some degree of accuracy.

This is hard-earned information

The Chronicle of the Earth is written on rocks, stacked on top of each other, with the oldest pages at the bottom and the newest at the top.

If it were that easy, geologists would be delighted.

actually not

The library called Earth is very old and

No librarian to organize the order

Over time, myriad geological processes cause all sorts of damage to old rocks.

Most pages are destroyed as soon as they are written.

Some pages are difficult to read, like parchments that record ancient scenes that have been overwritten many times.

Underneath the sand that accumulates over time, even a protected page isn't truly safe.

Earth's companion moon is rocky and dead, but the Earth is alive, full of creative and destructive forces, and a source of geological metabolism.

All the lunar rocks brought back by the Apollo astronauts were about the same age as our solar system.

Moon rocks are immutable

On the other hand, Earth's rocks are threatened by lithospheric activity.

A combination of fractures, compression, folding, heat, etc., breaks rocks apart.

So the book of Earth history is incomplete and messy.

The library is huge and wonderful, but it's aging.

The confusion and complexity of the rock record kept its meaning elusive until relatively recently.

Nature didn't give us an inventory, so a geologist had to devise one.

Five thousand years after the Sumerians conceived of recording their thoughts on clay tablets, the book of Earth's history remained a mystery to humans.

We were incapable of deciphering geology, ignorant of the records left on our planet, ignorant of our connection to the distant past.

It wasn't until the 19th century that my eyes opened. First, James Hutton, in his Theory of the Earth, said that the Earth showed no sign of a beginning or end.

That's what allowed me to say, "If you go there, you'll find Jurassic strata," or, "If you go over that hill, you'll find Cretaceous strata."

So if you want to dig for trilobites, get the right geological map and go to the Paleozoic rocks.

If you, like me, want to find dinosaurs, go to Mesozoic rocks.

Of course, fossils are only found in sedimentary rocks made from sand and mud.

Fossils are not found in igneous rocks that are formed from magma, such as granite, or in metamorphic rocks that are formed by heat and pressure.

I have to go to the desert

But that doesn't mean that dinosaurs lived only in deserts. Dinosaurs lived in every conceivable environment on every continent.

I mean, you should go to places that are now deserts, where there isn't too much vegetation covering the rocks, and where erosion is constantly exposing new bones to the surface.

So let's look for these three, sedimentary rocks of the desired age, in the desert, and then go to the site yourself and literally walk around and find the bones sticking out of the rock.

This photo was taken by me in southern Patagonia.

All the pebbles on the ground are fragments of dinosaur bones.

It doesn't matter if you find fossils under the right conditions, you find fossils.

The question is whether we'll find something more scientifically significant than that.

So let me tell you about a fourth formula that solves this problem: It's about staying as far away from other paleontologists as possible.

(Laughter) It's not that I don't like other paleontologists.

Because if you go to relatively unexplored areas, you're much more likely to find not only fossils, but new discoveries that contribute to science.

This is my way of finding dinosaurs, I'm trying it all over the world.

In the summer of 2004, in the southern hemisphere, I traveled to the far reaches of South America -- to the depths of Patagonia, Argentina -- in hopes of finding dinosaurs, where there are appropriately aged terrestrial sedimentary rocks, deserts, and places few paleontologists go.

and found this

This is a femur, or thighbone, from a giant plant-eating dinosaur.

The bone is 2.2 meters long

that's over 7 feet

Unfortunately this was the only one

We dug around and didn't find another bone in the area.

But it made me want to come back next year to find out more.

And the next year, on the first day of my field trip, I found this, again, a two-meter femur, and this time, I was able to find not just one, but 145 bones from one giant plant-eating dinosaur.

After three very difficult and grueling field trips, this is what the quarry looked like.

Surrounding me is a giant dinosaur tail.

The dinosaur lying here is a new species, which I later named "Dreadnoughtus Shurani."

Dreadnoughtus measures 26 meters from nose to tail

It's two and a half floors up to the shoulders.

People often ask if Dreadnoughtus was bigger than Tyrannosaurus.

It weighs 8-9 times as much as Tyrannosaurus.

A paleontologist's privilege is that when you discover a new species, you can name it.

What I always find frustrating is that too often, in reconstruction drawings, this giant plant-eating dinosaur is depicted as a passive, sluggish lump of meat.

(Laughter) But no.

Large herbivores can be hot-tempered and territorial, so don't mess with hippos, rhinos, or buffaloes.

Yellowstone bison hurt more people than grizzly bears.

Can you imagine? A 65-ton bull-like dreadnoughtus defends its territory during breeding season.

Dreadnoughts must have been terribly ferocious, and while they were a menace to the creatures around them, they themselves had nothing to fear.

That's why it's a "dreadnoughtus," "the one that fears nothing."

To grow this big, an animal like Dreadnought had to be efficient.

Its long neck and tail radiate heat to the outside, passively regulating body temperature.

In addition, its long neck allows it to feed very efficiently.

The dreadnoughtus was able to consume a large area of ​​plants within its neck from where it was standing, consuming tens of thousands of calories with very little calorie expenditure.

It also evolved into a bulldog-like pant leg, which made it incredibly stable, because when it weighed 65 tons and was literally the size of a house, a fall would mean death.

Dreadnoughtus was big and strong, but it couldn't withstand that kind of impact.

If you fall, you'll break your ribs and pierce your lungs

the organ ruptures

Weighing 65 tons, the Dreadnoughtus is not allowed to fall even once in its lifetime.

Now, this dreadnought corpse was buried in the ground, and a myriad of bacteria, worms, and insects degraded its flesh, exchanged molecules with ground water for a short period of time, and degenerated its bones, making them harder and harder, like gravestones.

As layers of sediment build up, pressure from all sides stabilizes and anchors the bone, much like a glove of stone grips it tightly for an extended period of time.

It's been a long time...

nothing happened

The monotonous flow of time continued and nothing happened.

All the while, Dreadnoughtus' bones lay endlessly in the stone graveyard in perfect silence.

Meanwhile, on the ground, Earth history was unfolding.

Dinosaurs reigned for the next 12 million years before being wiped out in a terrible catastrophe.

Continents moved and mammals rose.

When the ice age comes

In East Africa, a species of monkey that didn't look promising evolved a strange trick called conscious thought.

This clever primate wasn't particularly fast or strong, but

Adept at surviving over large areas, they undertook an astonishing migration whose range surpassed the range of dinosaurs that once existed. They spread across the globe, looting all the ecosystems around them, creating culture, metalwork, painting, dance and music, science in the process, and rocketing 12 intelligent monkeys to the moon.

With seven billion Homo sapiens roaming the planet, it must have been inevitable that one of them happened to step on a giant dinosaur grave buried in the wastelands of southern Patagonia.

i am the monkey

Standing alone in the desert, I found that the odds of each individual being in the fossil record were almost zero.

But the earth is so old

After an enormous amount of time, the improbable happens.

That's the magic of the geological record.

As the planet ages and ages, all sorts of creatures have been born and died, leaving behind an enormous amount of fossils, each a small miracle, but the collective result of necessity.

Sixty-six million years ago, an asteroid hit Earth, killing the dinosaurs.

It's quite possible that it didn't

But the only history we have is the history here and now.

But there was no necessity for this particular reality.

If the asteroid was so far away from Earth, even the slightest perturbation, it would have strayed far from Earth.

The day that the disaster that was decisive in wiping out the dinosaurs marked the beginning of the era that gave birth to modern society as we know it, but it didn't necessarily have to be that day.

It could have been another day, Thursday, or any day in the 63 billion days that dinosaurs thrived.

In geological time, things that shouldn't happen, things that are almost impossible do happen.

From our wormy Cambrian ancestors to suit-wearing primates, there are a myriad of crossroads that have led us to this particular reality.

Dreadnoughtus bones were buried in the earth for 77 million years.

who could have imagined? How could a shrew-like mammal that lived in the crevices of a dinosaur-dominated world evolve into a conscious being capable of knowing and understanding the traits of dinosaurs that would have terrified it?

I once stood at the headwaters of the Missouri River and stepped over it.

It's nothing more than a stream of gurgling water, flowing from beneath the boulders in the meadows high in the Bitterroot Mountains.

The stream next to it runs several hundred meters and ends in a small pond.

the two streams are very similar

But one is an unnamed stream and the other is the Missouri River.

Down to the mouth of the Missouri River, near St. Louis, it's easy to see that this is a big river.

But when you look at the Missouri River in the Bitterroot Mountains, it doesn't look like anything special to the human eye.

Now let's go back to the Cretaceous and look at our little ball of fur.

I don't think they would have evolved into something special, and if it hadn't been for that nasty asteroid, they probably wouldn't have evolved like this.

Even if I create a thousand worlds and a thousand solar systems and let time advance

you will never get the same results

I'm sure they're all amazingly improbable worlds, but they're just different from our world and our history.

There are countless possible histories

We got one of those - a good history.

Dinosaurs like Dreadnoughtus actually existed.

Sea monsters like the Mosasaurus also existed.

A dragonfly with a wingspan the size of an eagle and a pill bug with the length of a car actually existed.

Why study antiquity?

Because it gives you perspective and humility.

Dinosaurs died out in the fifth mass extinction, not the dinosaurs' fault, but a random event in space.

Dinosaurs had no power to predict that, no choice.

but we have a choice

The fossil record tells us that our place on Earth is uncertain and fragile.

At present, humans are causing widespread environmental destruction on a geological scale, and the scale is so widespread and severe that it can truly be called the sixth mass extinction.

But unlike dinosaurs, we can see through the threat of extinction.

And unlike dinosaurs, we can take action.

we can choose

thank you

(applause)

Some people think there's a winning formula for a TED presentation, "Speak on a round red carpet."

"Tell a childhood anecdote"

"Disclose personal secrets"

“Conclude with an inspiring call to action.”

no

That's not the idea of ​​a TED talk.

If you use too many of these props, you're likely to come across as cliche or manipulative.

But all the great TED talks have one thing in common. Let me tell you what it is, because over the last 12 years, I've heard hundreds of great TED speakers from the front row.

As I helped them prepare for the show, I learned directly from them the secrets to producing great TED talks.

Even though each person and what they say may look very different, they actually have one important thing in common.

What is it? The speaker's job, above all, is to bring a special gift into the minds of the audience, a strange but beautiful gift of "ideas."

let me explain what

this person is hailey

I'm about to give a TED talk, and frankly, I'm terrified.

(Moderator) Haley Van Dyke!

(Applause) During those 18 minutes, 1,200 people, many of whom have never met each other, feel their brains and Hailey's brains begin to synchronize, and so does the audience.

Their brain waves literally start to show the same waveform.

not only do you feel the same way

More amazing things start happening

Let's take a peek inside Haley's brain.

There are billions of neurons that are incredibly intertwined.

But look, here are millions of interconnected neurons representing an idea.

And the amazing thing is, that exact same pattern is reconstructed in real time in the mind of each and every listener.

Yes, in just a few minutes, patterns involving millions of neurons teleport into the heads of 1,200 people, just by listening to their voices and seeing their faces.

What are ideas anyway?

You can think of it as a pattern of information that helps us understand and navigate the world.

Ideas come in all shapes and sizes, from the complex and analytical to the simple and aesthetic.

Let's look at some examples from the TED stage.

Ken Robinson “Creativity is the key to a child’s future”

(Ken Robinson) My argument is that creativity is now as important in education as reading and writing, and should be treated equally.

(Chris) Elora Hardy “Bamboo buildings are beautiful”

(Elora Hardy) Bamboo grows everywhere, it's strong, it's graceful, it's earthquake-resistant.

(Chris) Chimamanda Adichie “People are not bound by a single concept”

(Chimamanda Adichie) A single story creates a stereotype, and stereotypes are problematic not because they are wrong, but because they are incomplete.

CA: My head is full of ideas, but they're not random.

cleverly connected

Taken together, they form an amazingly complex structure that becomes the person's view of the world.

It's the brain's operating system, so to speak.

That's how we run the world

Our worldview is made up of millions of individual ideas.

So, for example, if one of the little things in your worldview is the idea that kittens are cute, when you see this, you might react like this.

But if another component of your worldview was the idea that leopards are dangerous, when you see this, you might react a little differently.

That's why the ideas that make up the worldview are important.

Of course, we need to make it as solid as possible, because it's our guide to the terrifying and wonderful world of reality.

Other people's worldviews can be very different.

For example, how does your worldview react when you see this picture? (Dahlia Mogahead) What do you think of me?

A 'pious woman', an 'expert' or a 'nun'?

Or "suppressed", "brainwashed", "terrorist"?

CA: Whatever your own answer is, there are millions of people who react in very different ways.

That's why ideas matter

When properly communicated, ideas have the power to change forever how we think about the world, thereby shaping our current and future actions.

Ideas are the most powerful force shaping human culture.

A speaker's primary job is to build an idea in the mind of the audience, and if you'll accept it, here are four guidelines you should follow to tackle it: 1. Limit your speech to one main idea.

Ideas are complex things, and you need to focus on the one idea that you feel most strongly about, and pare it down so that you can explain that one.

Provide context, give examples, and articulate ideas

Make sure that the one idea you choose becomes the backbone of your entire speech, and that everything you say is connected to it.

[2] Giving listeners a reason to be interested

Before you can start building something in your audience's head, you first need to let them in.

What are the tools for that?

I'm curious

Arouse your audience's curiosity

Use engaging and provocative questions to clarify why some things are irrational and need explanations.

If you make them notice the holes in their world view, they will want to fill those holes.

Once that desire is aroused, it's a lot easier to put this idea together.

[3] Building ideas step by step using concepts that the audience already understands

Use the power of words to connect concepts that are already in your audience's heads, but in their words, not yours.

Start at the point where the audience is.

Speakers often forget that many of the terms and concepts they use every day are completely unfamiliar to their audience.

Metaphors play an important role in showing how the parts come together, because you can use ideas that your audience understands to show the shape of the pattern you want.

For example, Jennifer Kahn described this amazing new technology in biotechnology called CRISPR, saying, "It's like the first word processor for DNA.

CRISPR makes it very easy to cut and paste genetic information."

Vivid descriptions like this provide a satisfying epiphany when they get stuck in your head.

That's why it's so important to get your speech heard by a trusted friend and find out the parts that don't make sense.

[4] The final guideline is to make your ideas public and valuable.

And the way to do that is to ask yourself, "Who will benefit from this idea?"

This question must be answered honestly

If the idea is only useful to you or your organization, then I'm sorry, but it's probably not worth letting everyone know.

Audiences will soon find out

But if you think that idea has the power to lighten someone's heart, or change someone's mind for the better, or inspire them to change the way they do things, then you've got some great speech material to give to them and everyone else.

How much do you need to know about someone before you can afford to lend them money?

For example, let's say you want to lend a thousand dollars to someone sitting two rows behind you.

What do you need to know about that person to feel safe lending them?

My mother immigrated from India to America in her late 30s.

Now, I'm a private practice in Brooklyn, and I often have friends and neighbors come to me for outpatient care, and I don't care if I can pay them right away.

When I was with my mother, I ran into my mother's patients at the supermarket or on the side of the road.

My mother thanked me and asked about the patient's family and health.

I trusted my patients, so I paid a price to see them.

most of us feel like mother

I don't mind making loans to people I know or live next door.

But few people would lend it to a stranger, unless they knew something about him or her.

Banks, credit card companies, and other financial institutions don't know us personally, but they do have a way of trusting us: they use our credit score.

This is a collection and analysis of our personal credit information as general consumers.

This information makes it fairly easy for us to get the goods and services we need, whether it's getting electricity, buying a house, or starting a business at risk.

but

2.5 billion of the world's population have no credit score

That's one-third of the world's population

The reason there's no score is because there's no formal public record about the person, no bank account, no credit history, no social security number.

I don't have a score, so I can't access financial products that help me live better.

I have no trust

At my company, we're trying to figure out how these 2.5 billion people can build trust and access finance.

I built a mobile app that uses the data on your phone to stack your credit score.

There are now 1 billion smartphones in emerging markets

used the same way we use

You can text your friends, get directions, surf the web, make financial transactions and even make payments.

As you use it, this data accumulates in your smartphone, giving you a vivid picture of your life.

Service users are asked to provide access rights to this data, and the data accumulated through the app is

It helps us understand how creditworthy a person is, like Jennifer, who runs a small business in Nairobi, Kenya.

Jennifer is 65 years old and has been running her own stall in Nairobi's central business district for decades.

I have three sons, and I send them to vocational schools.

The stall business is going well

Income and expenses are tonton

But there are no financial guarantees

In an emergency, you could end up in debt.

I don't have discretionary income, so I don't have the money to spend improving my family's life, preparing for emergencies, or investing in expanding my business.

If Jennifer wants to borrow money, her options are limited.

If you're going to get microloans, you've got to get a few people to vouch for their credibility.

Even then, the amount of loan you get is so small that it's not really a good return on investment -- it's about $150 on average.

Of course, you can borrow from consumer finance, but that's risky because you're paying well over 300 percent interest.

Jennifer has no collateral or credit history, so she can't go to the bank and get a business loan.

But one day, my son convinced me to download a mobile app and apply for a loan.

He used his phone to answer a few questions and gave me access to key data points on my device.

What information came out

I will say from the minus part

Low savings balance, no loan history

This would have been a red flag for traditional banking.

But other information in the history that came up gave me a clearer picture of Jennifer's inner qualities.

For one thing, I was calling my family in Uganda regularly.

In fact, data shows that people with fewer contacts and regular contact have a 4 percent higher repayment rate.

Also, although Jennifer moves a lot during the day, her actual movement patterns are pretty much the same: either at home or at a food stall.

Again, according to the data, customers who spend most of the day consistently in the same place have a 6 percent higher repayment rate.

And Jennifer was interacting with a lot of people throughout the day, building deep partnerships.

Data shows that users with 58 or more contacts are more likely to be good borrowers.

In Jennifer's case, we found that she interacted with 89 people individually, and this was expected to increase her repayment rate by 9 percent.

These are just a few of the thousands of different data points we check to understand an individual's creditworthiness.

After analyzing all these different data points, we took the initial risk and loaned Jennifer.

The data you referred to is not found in any documentary history or any official transaction history.

be the foundation of trust

If you look beyond income, what you'll see is that people in emerging markets who seem high-risk and unpredictable are actually willing and able to repay.

Using our unique credit score, we have completed 200,000 loans in Kenya in the past year.

Repayment rates are over 90 percent, matching the repayment rates of traditional bank loans.

Something as simple as a credit score can give people the power to shape their own future.

People use their loans for everything from household expenses, to emergencies, to travel, to reinvestment to expand their own businesses.

This revitalizes the economy and the community, making it a place where residents can thrive.

Over the past two years, using our services, Jennifer's savings have increased by 60 percent.

I'm also planning to add two food stalls and start my own restaurant.

I'm in the process of applying for a commercial bank loan for a small business, because now I have a good credit history and can prove that I'm eligible for a loan.

I met Jennifer in Nairobi last week, and she told me how excited she was to get her first loan.

He said, "My son was the only one who believed I could do it. I thought I was not for it."

All her life, Jennifer thought she was in a closed world to which she had no access.

Our company's current mission is to make the world open to billions of people like Jennifer who deserve our credit.

thank you

(applause)

(plays the cello) (ends playing) I was thinking about my mother on the plane here.

I am a self-taught cellist and have never taken a lesson.

I studied double bass, but as soon as I picked up the cello, I started playing it because I really enjoyed it.

But my inspiration was my mother

I didn't realize that, because my mom got her music degree through a mail-in correspondence course called the US School of Music.

While raising two children, I took lessons once a week and practiced from them.

After a few years in that format, I gave a recital.

I turn 50 this month, and it's taken me that many years to realize how much my mother has inspired me.

My mother's influence will continue - yes, thank you, Mom.

(Applause) My mom is a great musician, but beyond that, she's also one of the most amazing people I've ever known.

I want to play a little bit for my mom, and for your moms too.

(Playing the cello) (End of playing) Usually when I hear the cello, this is the first thing that comes to mind.

(Playing Bach's "Unaccompanied Cello Suite No. 1") Not today

(laughter and applause) (sounds like drums) (cello) Hey!

(loop sample sound on stage) (cello performance and loop sample) (end of performance) (applause and cheers)

I'm an artist, but it might not be what you think.

I don't draw

I can't draw

My high school technology teacher commented on my report card that I was "dangerous."

You may not want to see my work

There's only one thing I can do, programming.

i can code

People all say, 100 years ago, there was no one like me who would make art with data.

well not wrong

But the truth is that long ago, art forms existed that used information and abstract ideas to create compelling works of art.

it's about music

We humans have been making music for tens of thousands of years.

Everything you think of in music - notes, chords, harmonies, melodies, etc. - is an algorithm.

These are systems designed to evolve over time and evoke our emotions.

I came to the art world from music

So, about 15 years ago, I started making works that I designed to be aware of the boundary between sound and image.

What you're seeing right now is a direct pictorial representation of the musical structure that musicians perform on stage.

So if you just know how to code with media, you can build pretty good stuff.

This is my project for the Sundance Film Festival.

The idea is simple: take all the Best Picture Academy Award winners, cut them down to one minute each, and then stitch them all together.

That way, in 75 minutes, you can see the history of Hollywood cinema.

The footage was a glimpse into the history of editing in Hollywood cinema.

The one on the left is "Casablanca" and the one on the right is "Chicago".

"Casablanca" should give you a better sense of what's going on.

This comes from the fact that in the 1940s, the average length of a scene was 26 seconds, whereas today's movies average six seconds.

The project was inspired by a government-backed effort in the early 2000s to use surveillance camera footage to locate specific individuals.

I've turned this code into a system that identifies a person, a person who is representative of our culture and who no longer needs to be monitored: Britney Spears.

I downloaded 2,000 paparazzi shots of her and built an analysis tool that could find her face alone.

With her eyes at the center of the footage, we can compose a series of scenes that offer two perspectives on our surveillance society.

We have a lot of anxiety about being seen, but we can't help but worry about celebrities.

What you're seeing right now is a work I did in collaboration with Leanne Amaris.

It's easy to say what she's doing, but it's another level to actually do it.

The 72-minute sequence of actions before going out for the night on the town, she stretched the scene over three days and performed it in slow motion in the middle of New York City.

I was there with the film crew.

We taped the whole thing, and then we sped up the whole process, and now cut it down to 72 minutes, and that's why her movements are so natural, even though the cars are just flying around.

And then I suddenly realized that what I'm doing is painting portraits.

This is what comes to mind when you think of a portrait

Gilbert Stuart on the left

He could be called America's first portrait painter.

And on the right is his portrait of George Washington in 1796.

called "Lansdown"

I think you can see a lot of things symbolized in this painting.

There's a rainbow outside the window, and you can see he's carrying a sword.

There is also a quill pen on the table

Everything pictured here reminds us of our founding father, George Washington.

And on the left is my portrait of George Washington.

This is an eye chart with words instead of letters.

There are 66 words, and they're all words he's used more in his State of the Union address than any other president.

So the word "gentleman" is his rhetoric and symbol.

The fact that he used the word most often must mean something quite significant.

And this is the checklist of George W. Bush, who was president at the time of production.

Think about how tracing the original "Gentleman" to the 43rd "Terror" tells us about American history and gives us new insights that are different than when we look at a series of paintings.

Through the political rhetoric of American leaders, we can see the changing course of American history.

Ronald Reagan spent a lot of time talking about debt.

Bill Clinton, on the other hand, has spoken of the next century, where he's no longer president, and his wife may be in it.

Lyndon Johnson was the first president to televise his State of the Union address in prime time, beginning every paragraph with the words "Tonight."

Richard Nixon, or rather his speechwriter William Sapphire, spent a lot of time choosing words to ensure Nixon was sincere.

The project was presented as a series of giant sculptures.

It is an outdoor exhibition where boxes with lighting are lined up.

The important thing is that this works as an eye test, and if you can read the words between the black lines at six meters away, you have good eyesight.

(Laughter) This is a portrait, but there are many more.

There are many ways to generate these things with data.

What I started looking for was how we could make portraits more democratic, how we could better represent our country and who we are.

Every ten years, a census is taken in this country.

Literally count the population, find out who lives where, what they do, what language they speak at home.

I think it's certainly important and indispensable.

But then I don't know what it really looks like

You don't tell me your dreams and hopes

So in 2010, I start the original census.

They wanted that kind of material, written by the average American, and more descriptive.

And I found that there was already a mountain of these documents lying right in front of me.

is a dating site

In 2010, I signed up for 21 dating sites, all genders, including gays and other LGBTQ people, using every zip code in the United States, and downloading 19 million profiles -- 20 percent of the adult population in the United States.

i have obsessive compulsive personality disorder

You may have already heard it, but please hear me out.

(Laughter) What I did was organize all the documents by zip code.

and tried linguistic analysis

Here are some profiles I got in 2010, and you can see the word "lonely."

Let's map these out. Higher luminosity means more use of the word "lonely," so you can see that Appalachia is a very lonely place.

Analyzing "Funny" Nebraska people look bored

A map of the word "kinky" shows that women in Alaska can have a good time with men in southern New Mexico.

By the way, you can also look at this analysis at a more granular level, and men on East Long Island, New York, seem to want their butt spanked far more than men on West Long Island.

This is probably the only piece of information you will remember today.

Only this memory probably won't fade even after 30 years

(Laughter) And if we apply these things to cartography, we can use maps to do the same things as the visual charts.

Let's replace the name of each city across the United States with a word that is characteristic of that area.

If you've ever dated someone from Seattle, you'll know.

Here is "Pretty" "Heartbreak"

"Live music (Gig)" "Cigarette" etc.

I hear they can play and smoke

Now if you look to the right, you'll see "Email."

Redmond, Washington, where Microsoft is headquartered

Many things are predictable.In Los Angeles, it's "Acting."In San Francisco, it's "Gay."

Some examples are a bit heartbreaking

While Baton Rouge talks about "Curvy," downstream New Orleans still talks about "Flood."

People living in the capital say "Interesting"

Baltimore, Maryland People Are Afraid

this is new jersey

I grew up somewhere between Annoying and Cynical.

(Laughter) (Applause) The most used word in New York is "Now" when you say, "I'm a waitress now, but I'm actually an actor."

(Laughter) "Now, I'm an engineering professor at New York University, but I'm really an artist."

I saw the word "Dinosaur"

this is syracuse

The best restaurant in Syracuse is "Dinosaur BBQ" involving Hell's Angels

This place is like going on a date with someone

I live in Midtown between "Unconditional" and "Midsummer".

Upscale North Brooklyn is like this: DJ, Glamorous, Hipsters, Urbane.

This may be a more democratic portrait.

So the idea was, what would you like to do on Friday night, and based on that, what if you could visualize it on a map?

this is a self portrait

Over 20 years, I analyzed 500,000 of my emails and drew them.

You can think of it as a quantitative selfie.

Run a physics formula based on personal information, and that's what I do.

Imagine all the people I've ever interacted with

It starts in the center and spreads out like the big bang

We have a gravitational pull on each other, a gravitational pull based on how much email we send and how much we receive.

We're also analyzing the emotional side of things: the person who says "I love you" is more important.

Pull my email address in the middle to create a big star stream.

By the way, all the names are handwritten.

Sometimes I use real-time data in my work to portray a specific problem in a specific city.

This is a Walther PPK semi-automatic 9mm pistol that was used in the New Orleans French Quarter shooting two years ago on Valentine's Day, triggered by a parking dispute.

The cigarette in the back is mine

This house was the scene of the shooting

This project uses a little bit of mechanical engineering.

I made a pivot out of a bike chain, and it's computer controlled.

This computer and equipment will be hidden in a box.

The pistol is welded upwards to an iron plate

A wire hooked to the trigger, the computer in the box is always online

Every time a shot is fired in New Orleans in response to a 911 call to the New Orleans Police Department, a gunshot rings out.

Since it is a blank gun, there is no warhead.

Strong light and noise are emitted Don't forget that you are surrounded by a case

In New Orleans, there was an average of five shots a day, and over the course of four months, empty shells piled up and filled the case.

It's "information visualization" that you are all familiar with.

This clarifies the problem if done correctly.

If used incorrectly, it numbs the senses.

It replaces people with numbers.

Please be careful

this is the last work

I spent last summer in Times Square as an artist-in-residence.

Times Square in New York is truly a source of information for the world.

Many people don't know that Times Square is the most Instagrammed spot on earth.

Every five seconds, someone takes a selfie in Times Square and posts it.

I have all those photos, 17,000 a day.

(Laughter) I prefer to take selfies with my face facing the front.

In all civilizations, art has been produced using the highest standards of technology.

And artists have a responsibility to ask what technology means and how culture is reflected.

Finally - we are more than numbers

We are humans, we have dreams and ideas.

Treating people as statistics is too dangerous.

thank you

(applause)

Hello

This was my first time traveling, for the first time in my life, outside the walls of Gaza.

I am very honored to be here.

(Applause) I've always dreamed of being a pilot and flying an airplane, flying freely, touching the sky --

but it didn't work

I live in Gaza and there's no airport there

All borders are closed in all directions

I mean, I live in the biggest prison in the world.

All I can do is look up at the sky

We are lucky if we have electricity for four or five hours a day.

When it's cold, we make a bonfire in front of the house or on the roof.

I sometimes cook there

My job in Gaza is to arrange for journalists who come to my hometown to report on what's going on in Gaza.

In the morning, I will go to the border area and pick up the reporters.

If something happens to a reporter, or if a reporter tries to write a story that doesn't go along with the government, it can get very bad.

It's my job to get journalists, filmmakers and news teams where they need to go.

I believe that to do my job well, I need to build relationships not just with journalists and the press, but with the Gaza community.

These communities don't want to be in the press, and I've never thought of them as "articles" or "numbers."

They're human just like I am

Over the last ten years, I've built many relationships.

resulting in

I have the opportunity to reach out to people and have access to stories that other people don't have access to.

As a woman, there are times when I feel like I have more power.

Many male journalists in this society want to cover stories about drug addiction in our country.

This problem started when the tunnels in Gaza were being dug.

When Gaza was blockaded, the tunnels brought people all the necessities like food, building materials and other supplies they needed.

But the Egyptian side has blocked the tunnel by injecting water into it, so the tunnel is no longer working.

Drugs were being smuggled back then, and many young people became addicted to them.

In traditional Palestinian society, men are forbidden from entering other houses.

So none of the male journalists are listening.

but i was able to do it

I have an amazing husband who supports me despite all the criticism that society throws at me.

He's home now with two children, and I have another one growing up here.

(Applause) When I'm at work, I call my husband every two hours. When he finds out he hasn't heard from me, he has to call my contact person, who is the person who gives me permission to interview and who I trust.

Here's what happened in Gaza, when a British journalist named Alan Johnston was kidnapped, and I was asked by an American magazine to meet with the kidnappers in Gaza, and I did.

The journalists following the case and I were instructed to wait outside the hotel.

They came and put us in a black car with black blinds on the windows, and they were wearing masks that day.

And we were taken out into the middle of the suburban wilderness.

We had our phones taken away and we interviewed the kidnappers in the wilderness.

I will never forget the day that was so terrifying.

Why am I doing this?

Because I believe that if I don't do it, a big part of the story about Gaza will be undermined.

I have more stories to tell you about my country.

Not all of them are tragic

I love my country, despite the dire conditions we live in - lockdowns, poverty, unemployment - but there is a "living life."

There are dreamers and wonderful people full of energy.

We have good music and good music schools.

There are parkour dancers dancing in the rubble of their crumbling home.

And Gaza is the only place in the Arab world where Muslims and Christians live together in strong brotherhood.

(Applause) The hardest thing for me during the war is leaving the kids and leaving early in the morning.

I take pictures of my children every day, because I have no idea if I'll ever be able to go back to them.

Being a fixer and a journalist is difficult and dangerous in Gaza

But when I hear artillery shots and bombs, I just go straight for it, because I want to be the first one, because the story deserves to be told.

When my children were young, when they heard the sounds of battle, I would say, "That's fireworks."

Children are now grown up and able to understand

I have really horrific nightmares because of everything I witnessed in combat, especially the dead bodies of young children.

I still remember a young girl named Hara.

she's the only survivor of that family

I'm going to keep her picture with me

i will never forget her

I am proud to stand here and be with you today.

I am proud to tell you stories of sad and happy stories from Gaza, a small corner of the world.

I am proud to be the first female fixer in Gaza.

It's funny, they call me "Rambo of Gaza"

(Laughter) I hope one day all women will have the opportunity to tell the stories of the amazing women I know in our country.

I hope one day I can help other women in our country become fixers like me.

But of course, there are times when I feel like I can't do this job anymore, and I can't take it anymore.

But it reminds me of the words, "Don't set limits, challenge yourself.

Don't let others stand before your dreams."

thank you

(applause)

“Are we doing our best to fight climate change?”

I didn't come to this question as a green activist -- in fact, I can't help but recycle --

Because as a professional observer of monetary policymaking, I wonder how history will judge our policy decisions today.

Someday, this ring that belonged to my grandfather will pass to my son Charlie.

I wonder, what would his generation, and the generations that followed, think of the two generations that owned this ring?

my grandfather was a miner

In his time, the practice of burning fossil fuels as a source of energy for economic development was accepted.

In modern times, it turns out to be a bad practice, because of the greenhouse gases produced by burning coal.

But in this day and age, I fear that, perhaps, the industry I work in will receive even more scrutiny than the industry my grandfather worked in for the magnitude of its impact on the climate.

Yes, I work in the financial industry. When you think of this industry, you probably think of the financial crisis of 2008, when governments shifted their attention and money from very important deals to the financial crisis.

This arrangement is already in trouble

This is a big problem because the transition to clean energy has to happen as soon as possible.

Because, first of all, once released, greenhouse gases float in the atmosphere for decades.

Second, if developing economies build their energy grids around petroleum fuels today, it will cost them even more to change in the future.

So history may judge that the financial crisis came at just the worst possible time on the climate issue.

But this story shouldn't be so dark.

Three years ago, I suggested that the tools governments had in place to save the financial system could be used for other global challenges.

It's getting more confirmation with time

Let's take a quick look at what those tools are

When the global financial crisis hit in 2008, central banks in the United States and Great Britain began buying government bonds issued by their own governments, a policy called "quantitative monetary easing."

Depending on what happens when they mature, this is effectively a money reprint.

And countries continued to print

In the United States alone, four trillion dollars of currency has been issued.

This was not done in one country alone.

In a remarkably coordinated effort, the 188 countries that make up the International Monetary Fund (IMF) have printed a total of $250 billion in their own currencies -- using the "Special Drawing Rights" (SDR) -- to bolster reserves around the world.

When the financial crisis hit Europe, the president of the European Central Bank (ECB), Mario Draghi, promised, "We will do whatever it takes."

and did

The Bank of Japan followed suit, adopting exactly the same commitment as an economic stimulus package to "break through this situation at all costs."

In both cases, "no matter what" meant a multitrillion-dollar reprint that continues to this day.

This has shown that in the face of global challenges, politicians can act with a sense of urgency, act in concert, and take drastic measures with unconventional policies like quantitative easing.

Let's go back to the first question: can we use quantitative easing to fund climate change?

Three years ago, this kind of thinking was kind of taboo.

Once you get rid of the notion that money is a finite resource, governments will be overwhelmed by public demands for more printing, driven by a variety of policies: education, health care, social security -- defense spending.

Quantitative easing has a history of failures, with unmanageable monetary easing leading to hyperinflation.

Remember the Weimar Republic in the 1930s, and as recently as Zimbabwe in 2008, the price of basic goods like bread doubled every day.

But this has fueled the debate about quantitative easing, which is now being talked about in the financial media and even appearing in public promises.

But it's important that the monetary easing debate doesn't end there.

Given that climate change is a global challenge, there are good reasons to print more of the IMF's sovereign currency to finance it.

The Special Drawing Right is the IMF's electronic accounting unit for transferring funds between governments.

Imagine something like a peer-to-peer payment network, like bitcoin for governments.

This is a global system

Each of the 188 IMF member countries has set aside SDR contributions as part of its foreign exchange reserves

This is what nations are preparing to protect themselves in a currency crisis.

It's this global nature that made it possible for the IMF, in 2009, to release an additional $250 billion of quantitative easing, to protect countries big and small at once, and to take action in a coordinated international fashion.

but surprisingly

More than half of the 2009 SDRs, worth $150 billion, went to countries with mature markets, but they were based on flexible exchange rates and didn't require as much foreign reserves.

These additional reserves, issued in 2009, ultimately weren't necessary, at least not for the developed world.

to this day they are untouched

there's a good idea

What if the first step was to use this pristine 2009 special drawing right to fight climate change?

For example, it can be used to purchase Green Climate Fund (GCF) bonds issued by the United Nations.

The fund was created in 2009 following the Copenhagen Accord on climate change.

Designed to complement the resources developing countries need to reach their climate goals.

The fund raised $10 billion, making it the most successful fund of its kind.

But if the special drawing rights that are issued are used instead, the government can correct its trajectory and pay for a promise of $100 billion a year to help developing countries fight climate change -- a promise that has been put on hold by the global financial crisis.

This can also be a test case

The inflationary pressures created by the issuance of Special Drawing Rights (SDRs) are benign, and further new SDR issuances -- even every five years, for example -- can prove effective and meaningful. And with this commitment, developed countries will be able to use their new allocation of Special Drawing Rights to contribute to the Green Climate Fund.

This kind of government bond currency reprint has several advantages over the domestic currency reprint.

First, the argument that spending money to stop climate change is in the public good is clear.

No part of the world benefits more than others.

Conflict issues can be avoided

You could also say that the issuance of new Special Drawing Rights would require the consent of so many countries that it would be unlikely that the reprint would get out of control.

The result is a coordinated global action -- a well-managed global action -- aimed at the common good of the international world.

And as we learned with quantitative easing, any concern can be sidestepped by rules.

For example, new issuance of these SDRs every five years can be capped, such that this international currency cannot exceed 5 percent of the world's foreign exchange reserves.

This is important because it allays concerns that special drawing rights threaten the dollar's dominance in international financial markets, which the United States might be leery of.

In fact, the only thing the SDR might take away from the currency under this setup is probably its nickname, the "greenback."

Even with the cap, the IMF was able to issue another $200 billion of SDRs in 2014 after the huge issuance in 2009.

So, hypothetically, developed countries could have invested up to $300 billion in SDRs into the Green Climate Fund.

That's 30 times what the GCF holds today.

And yet, this hopeful tale evokes the potential of the "whatever it takes" spirit.

Imagine the incredible work that that money could enable. For example, in 2009, Norway pledged $1 billion in aid if Brazil reached its deforestation reduction target.

This program has achieved a 70% reduction in deforestation in the last decade

That's the equivalent of 3.2 billion tons of carbon dioxide emissions, equivalent to the amount of CO2 that every car in America would emit in three years.

What if there were 300 performance-based climate projects like this around the world?

It will save generations of CO2.

So let's stop making excuses about whether we can invest in climate change.

The real question is, if we take our future generations seriously, can we take drastic measures like saving the financial system?

In the end, we actually took that drastic action, and we continue to do so.

We absolutely, absolutely have to realize it "by any means"

thank you

(applause)

Interestingly, the vast majority of health care spending in the United States, both public and private, is for treating cardiovascular disease.

The cost is overwhelming

Cardiovascular disease, the number one killer in Africa, is completely ignored

This situation can't be right and we need to fix it

The health status of the population improves with the development of the country

17 million people die each year from cardiovascular disease

32 million people will have heart attacks and strokes

Most of this figure comes from developing countries, mostly Africans.

Global cardiovascular disease is happening in the developing world, not in the West, but 90 percent of medical resources are in the West.

It's people like you who are at risk.

Africans aren't the only ones to worry about

Anyone who needs to go to Africa should take this deplorable situation into consideration.

What do you do when this happens? What if you go back to Africa and before you go to bed you start having chest pains, shortness of breath and sweating?

It's a heart attack. What are you going to do?

Do you fly back to America/Germany/Europe?

50% chance of dying within 24 hours if left untreated

Here is the current age distribution

America on the left, Africa on the right, 10 million people here.

In Nigeria, by the time you're 50, the population is dwindling, and life expectancy is said to be 47.

It's not because a lot of people die in childhood from disease.

It's the busiest time

I'm old enough to work for Africa's development, but I can't reach that age.

Death of parents is the worst scenario for creating a cycle of poverty

Without securing parents, it is impossible to guarantee a healthy life for African children.

What are the risk factors in this case?

It's well known, but I don't have time.

I will list them for reference: high blood pressure, diabetes, obesity, and lack of exercise.

Here in Tanzania, 30% of people have high blood pressure.

20% of these receive treatment

Less than 1% of people receive adequate treatment

If hypertension alone was treated properly, it would save 250,000 people a year across Africa, which is amazing.

Treatment is easy Look at the situation in Mauritius

In eight short years, treatment for HIV and malaria has all improved.

We cannot afford to make the same mistakes we made with malaria and HIV.

In eight short years, non-communicable diseases will become the leading cause of death in Africa.

Remember you can't deal with problems in this situation

This is the quintessential African hospital, the elite are unreliable, they go to the United States, Germany, the United Kingdom for treatment.

Support from overseas alone is not enough

This is the situation. Countries are shutting down.

After 9/11, America had a lot of problems to deal with.

So the money is being spent on solving domestic problems.

Africa's problems are not America's responsibility, they are ours. We have to deal with our own problems.

I would love to have help, but I don't expect it.

Africa's deteriorating health and wellness indicators require a new way of looking at it.

If it didn't work, you need an alternative

I will tell you the solution

that was difficult to achieve

A few years ago I started thinking

"The problem is known, but no one knows the solution."

I believe that we need to invest in things that we really need.

We are all ready to put money into grant aid to developing countries.

But when I say, "It's a sustainable investment," people lose interest.

Then you can't raise funds

I've been in the health care business in the United States, and I live in Nashville, Tennessee, the center of health care in the United States.

Financing medical ventures here is fairly easy

But when you say "in Nigeria..." they run away.

It's a big mistake. Anyone here who wants to help Africa should invest in sustainable development.

So, to give you a little idea of ​​what we do, I'm going to show you a day at the Heart Institute, and then I'll go into more detail.

We've proven that the quality of care we provide in the developing world is as good as the best in the world.

We currently employ 25 people who have been trained and licensed in the United States, Canada and the United Kingdom.

Whether it's Vanderbilt or the Cleveland Clinic, they have all the medical technology that's being done anywhere in the United States, and the cost is about 10 percent of what it used to be.

(Applause) And it's also our policy not to deny treatment to patients who can't pay.

treat everyone

(Applause) You have $1, $2? It does not matter

I will show you how to implement this method.

First of all, we try to choose the right equipment.

Modular unit Multi-function unit uses modular components for easy repair No non-durable equipment

We put a lot of effort into training, and we make sure that the process is regenerative.

We're going to die soon, but the problem won't go away, so let the next generation take over.

let us make things ourselves

I don't buy off-the-shelf radiopharmaceuticals

buy manufacturing equipment from a company

Reduce costs by manufacturing in-house

A unit of radiopharmaceutical in the United States costs 250 dollars.

(Applause) The only way to bridge the wealth gap between nations is through education and access to technology.

The problems we're talking about here will all be resolved as the country develops.

Technology is key to equality How do we make this happen?

It's been proven that doing it yourself is economical.

That way, rural centers can have smarter access to specialists.

The center was established in this way

We already have three in the Caribbean, and we're in the planning stages for a fourth.

We have also decided to advance to Africa, and in 2008-09

The West African Heart Institute project is set to begin in Port Harcourt, Nigeria, in the next few months, with an eye toward opening.

Other centers are also planned

This model can handle any disease

All units Connect all centers to central server via switching hub Images are placed in review station

We own the copyright to this telemedicine, but if you're interested, we'll share the results of our research, and it's profitable.

Our telemedicine platform is designed to give you one-click access to specialists from anywhere in the world.

I'll show you the steps here

Heart Institute Doctors can log in from anywhere

I dialed Switzerland and said, "Log in to Mr. Jones.

Please give us your opinion on the test results.”

With information from Switzerland, we can provide better care to our patients.

No patient movement required

Patients do not feel anxiety about lack of knowledge due to lack of specialists.

We also have an electronic medical record system

America's technology is great, but only 20 percent of hospitals have this electronic medical record.

that's fine in america

If it's not in Nashville, it's two hours away in Birmingham. If it's not in Cleveland, you can go to Cincinnati. We can't afford that luxury.

If this is realized, medical costs will be reduced.

And then we're going to extend this to rural centers and make it more accessible.

This way everyone can get the treatment they need

We know that technology isn't the only thing we have to rely on.

I would like to emphasize that disease prevention is part of the solution.

I need to tell people what is possible

I tell people to do expensive things, but I can't go home and do them.

the patient must first live and live

I recommend exercise as the most effective and easiest thing to do.

We form groups in March and April every year.

We are doing a walking challenge

There is a prize for the group that loses the most weight

We also give prizes to the group with the largest pedometer, and we do this regularly.

I urge you to bring your children

This is how we develop an awareness of the problem from an early age. Once we recognize the problem, we continue to take action. Through this program, we have produced 100 doctors in Jamaica alone who have completed their special training and have specialized knowledge.

I've seen over 1,000 impoverished patients who would otherwise have died, including four with complete atrioventricular block, who received free pacemakers.

I would have died without my pacemaker

I'm glad I saved you

By not having to travel from Jamaica to Miami or Atlanta for treatment, we've indirectly saved Jamaica $5 million in health care costs.

I would be happy if I could save many lives

By the end of this year, we'll be contributing $1 million to health care for the poor. $340,000 in the first four months. That's an average of $85,000 a month.

you need money but we're not

People ask me, "How did you do that?"

Since the founding of the Caribbean Heart Institute, at least 4,000 Jamaicans who previously went to Miami for treatment have said they quit.

It would cost eight or ten times as much to go to Miami, and people are happy that they can get the same quality of care and spend the savings at home.

If one patient pays, we can see at least four patients who cannot afford to pay.

(Applause) For this method to work, it has to be sustainable.

This is why training is so important

To improve, we partnered with the Jamaica Institute of Technology, and now I have a job here.

We're going to create a biomedical engineering program to train local equipment repairers.

That way you don't have to worry about aging equipment.

We're also planning to launch an auxiliary medical skills training program to train echocardiography, or cardiac diagnostic ultrasound, and these new programs are motivating our trainees.

They can get bachelor's degrees in medical imaging and other certifications.

Jason: It's Jason

I'm a senior resident anesthesiologist in the intensive care unit at the University Hospital of the West Indies.

Since I came here in 2006, I've trained in elective anesthesia and intensive care programs.

I was at the Heart Institute for three months.

There's no doubt among my colleagues about the usefulness of the training here, and there seems to be an increasing interest in echocardiography and its use in particular.

Sharon: I've been working as an echocardiographer at the Caribbean Heart Institute for two years, and I did my training here.

The cardiology training we have brought to Jamaica has been very helpful in diagnosing heart disease.

Ernest: So health care delivery in the developing world is possible, sustainable, and accessible to everyone.

Who said, "Poor people don't get the best care?"

When did you become a god?

I don't make decisions like that. My job is to create an environment where everyone can enjoy the best medical services, regardless of their destiny.

As I mentioned earlier, our next step is to establish the West Africa Heart Institute in Port Harcourt, Nigeria, and we plan to open centers in other parts of West Africa.

We will introduce the same system to other fields such as dialysis treatment.

If you're interested, I'd be more than happy to share our experience and give you advice, so that we can change the landscape of healthcare in Africa.

Now is the time to help Africa, which has helped us.

I do. Comrades are welcome.

thank you

(applause)

The next 16 minutes will take you on a journey to humanity's greatest dream: to understand the code of life.

For me, it all started many years ago when I first encountered a 3D printer.

I thought it was a fascinating concept.

3D printers require three things: a little bit of information, raw materials and energy, and they can create anything that hasn't existed before.

I was doing physics, but when I got home, I realized that I had known about 3D printers for a long time.

everyone knows

it's the mother

(Laughter) My mother brings in three elements, a little bit of information -- in this case, my father and my mother -- the raw materials and the energy are the same thing, we get them from food, and a few months later I'm manufactured.

I didn't exist before

Aside from my mother's shock when she found out I was a 3D printer, I was immediately drawn to the first element: information.

How much information do we need to assemble a human being?

Is it many? Is it less?

How many USB memory sticks will it take?

I was originally studying physics, so I tried to approximate humans as giant LEGO bricks.

The individual blocks are tiny atoms, here's hydrogen, here's carbon, here's nitrogen.

As a first approximation, if we could identify all the individual atoms that make up the human body, we could build it.

If you do the math, you'll get a surprising result.

The file I'm trying to put on a USB stick, the atomic data to assemble a tiny baby, is 2,000 times more than a USB stick full of the Titanic.

this is the miracle of life

The next time you see a pregnant woman, she's compiling the most information you'll ever come across.

Big data is not eyes

this is the most information that exists

(Laughter) Fortunately, the natural world is much smarter than this fledgling physicist, and over the course of four billion years, has packed this information into tiny crystals called DNA.

We came across this in 1950, photographed by the brilliant female scientist Rosalind Franklin.

But it took more than 40 years for humans to be able to poke inside a human cell, take out this crystal, unfold it, and read it.

The code is written in four simple alphabets: A - T - C - G.

And it takes 3 billion characters to make a human.

3 billion is

what number?

It's a number that makes no sense

I thought, how can I explain how big this cipher is?

And so I decided to enlist the help of others, and I can't think of anyone better than Craig Venter, the pioneer of genome sequencing, to help me explain this code.

Let me introduce you to Dr. Craig Venter.

(Applause) For the first time in history, the genome of a specific human being was printed in a book, not the person itself. It's page by page, letter by letter, 262,000 pages of information, weighing 450 kilograms.

it's a great achievement

Here's a visualization of the code of life.

Now you can have some fun

You can look inside and read.

Let's take a look at a book that looks interesting, for example this

I put a sticky note on it because it's such a big book.

Let me show you what the code of life looks like

There are thousands, tens of thousands, billions of characters

there must be some meaning here

look at a particular part

I'll read it to you (laughs) AAG AAT ATA

It sounds silent, but this array specifies Craig's eye color.

Let's see another volume

this is a little more complicated

Chromosome 14 Volume 132 (laughs) You guessed it.

（笑） THAT CTT GATT

This guy is lucky, because if he misses just two letters in this part -- just two out of three billion letters -- he's doomed to a terrible disease: cystic fibrosis.

We don't know how to cure it, we don't know how to save it, and it's caused by just two letters of difference.

A wonderful book, a powerful book, this book teaches you some pretty amazing things, let me show you.

Whoever you are, what makes me who you are is only 5 million characters out of this, less than half of a book

the rest is exactly the same

500 pages create the miracle of life that is you

the rest is common with everyone

When you think people are all different, think about that.

the amount we share

I hope you've been a little bit curious, so the next question is, how do you read this?

How can I make sense of it?

No matter how good you are at building Swedish furniture, you'll never be able to decipher these building instructions in your lifetime.

(Laughter) So, in 2014, two prominent TED speakers, Peter Diamandis and Craig Venter themselves, decided to form a new company.

Human Longevity has one mission: to learn all there is to learn about this book, to try everything it can to try, to realize the dream of personalized medicine, what must be done for better health, and what the secrets of this book are.

It's been a pleasure working with such an amazing team of people, including 40 data scientists.

Conceptually it's very simple

using a technique called machine learning

One side has thousands of genomes.

On the other hand, we have one of the largest human databases: phenotypes, 3D scans, NMR, anything you can think of.

There is an unknown transformation process between the two.

we build machines in the middle

We're training, not just one, but many machines, trying to understand the genome-to-phenotype translation.

What is this string and what does it do?

This is an approach that works for everything, but it's especially complex in genomics.

Little by little, we've expanded and opened our arms to different challenges.

I started with mundane traits

The good thing about common traits is that they're common and everyone has them.

And I started asking these questions after reading this book.

Can you predict height?

It's actually possible, we can predict with an accuracy of five centimeters.

Your weight is highly dependent on your lifestyle, but you can still make a rough estimate, to an accuracy of 8 kilograms.

Can you predict eye color?

can

80 percent accurate

Can skin color be predicted?

It can be done with 80 percent accuracy.

Can age be predicted?

We can, because our base sequences change throughout our lives.

shortened, missing or inserted

Models can be created from various features

An interesting question is, is it possible to predict a person's face?

This is a little tricky, because the information that defines a person's face is spread across millions of base sequences.

The human face isn't very neatly defined.

To learn it, you had to build a whole hierarchy, teach the machine what a face is, and embed and compress it.

If you're familiar with machine learning, you know how difficult it can be.

It's been 15 years since we read the first sequence, and we started seeing significant results last October.

It was a very emotionally uplifting moment.

What you're seeing here is a subject who came into the lab.

use this face

We take facial data from subjects and reduce the complexity, because not everything about a face is determined by genes, and different features, imperfections, and asymmetries occur throughout life.

Symmetrize the face and run it through the algorithm

What you'll see next is the predicted face from the blood.

(Applause) Hold on.

At this moment, your eyes compare the left face with the right face, and your brain tries to identify the faces.

So let me give you one task

Look for differences There are many

The biggest characteristics come from gender, then age, BMI, and race.

From there it gets a lot more complicated

I think you can see that even though there are differences between the two faces, they generally match.

I can even feel the emotion

This is another test subject. Here is the prediction.

The actual face is a little smaller, and it doesn't fit the skull perfectly, but it doesn't deviate too much.

This is the subject's face This is the predicted face

At the time of machine training, these faces were not shown.

This is the evaluation data called the holdout set.

You may not believe this

They're all published as scientific papers, so you can read them.

Chris gave me a challenge to perform on stage.

I think we should play hard and predict faces that you can recognize.

In this vial of blood, you can't imagine how hard it would be to get this blood, but in this vial of blood, there's enough information to sequence the entire genome.

this is all you need

Now that we've examined this sequence, let's take a look at it together.

I will add up everything I know

I assumed from this blood that it was a man.

Subject is male

I thought you were 176cm tall.

I'm actually 177cm

Estimated 76 kg, actually 82 kg

Estimated age is 38

actually 35 years old

Predicted eye color —

a little too dark

Prediction of skin color

roughly agrees

this is the expected face

It's a revealing moment. This is the subject's face.

(Laughter) I did it on purpose.

I am a very special strange race

Southern Europe is Italian and never fits the model.

This race is a complicated special case in our model.

but there is one more

One of the things that's commonly used to tell people apart is not written in their genes.

What you look like is partly a matter of free will.

It's not a hairstyle here, it's a beard.

Let's transfer the beard. It's not modeling, it's just image manipulation. We copy the subject's beard.

And it's going to look a lot like

why are you doing this?

It's not about predicting height or making pretty pictures out of blood.

Using the same technology, the same approach, machine learning of the genetic code helps us understand the body: how it works, how it ages, how disease develops, how cancer develops, how medicine works, and how it works for you.

this is a big challenge

a challenge pursued by thousands of researchers around the world.

called "personalized medicine"

We can go from a statistical approach, where you're just a dot in an ocean, to an individualized approach, where you read all of this genetics book and get to know exactly who you are.

It's a very complicated task, because we currently only know about 2 percent of all the books -- 4 out of 175.

This is outside the scope of my talk. We will learn.

Because this subject is challenged by the best minds in the world.

Predictions are getting better, models are getting more accurate.

The more you learn, the more you're going to face decisions you didn't have to face before, about life and death and parenting.

We're trying to get into the very inner details of how life works.

This revolution is not limited to science and technology.

global dialogue will be needed

We have to start thinking about the future we're building as a human race.

We need to talk to creators, artists, philosophers and politicians.

It's about everyone, because it's about the future of humanity.

Fear not — but we must understand that the decisions we make in the near future will forever change the course of human history.

thank you

(applause)

What I have is very old

It's older than any man-made object, older than life on Earth, older than any continent or ocean that surrounds it.

It formed more than four billion years ago, in the early days of our solar system, when planets were being born.

This rusty hunk of nickel and iron doesn't look anything special, but if you crack it open,

It turns out that it's different than the metals on Earth.

These patterns are metallic crystals that can only occur in space, where molten metal can cool very slowly, a few degrees every million years.

in the millions of objects called asteroids left over after planet formation

It was part of something much bigger than this blob.

Asteroids are the oldest and most numerous nearby objects.

This image shows an asteroid near the Earth orbiting the Sun. Yellow is the Sun. The asteroid is orbiting around the Earth's orbit, shown in blue.

The sizes of the Earth, the Sun, and the asteroids are greatly exaggerated to make it easier to see.

Teams of scientists around the world are searching for these objects, making new discoveries every day, and steadily building up a map of the universe near Earth.

Much of that budget comes from NASA.

I think asteroid hunting is a huge public works project, because instead of building highways, we're mapping outer space and creating public records that will last for generations to come.

Last year, 1,556 asteroids were discovered near Earth.

These are what's known as near-Earth asteroids, and the total number, recently updated, is 13,733.

Each one has been photographed, sorted into data, and its orbit around the sun determined.

Depending on the asteroid, most planetary orbits are predictable for decades.

Some of their trajectories can be predicted with astonishing precision.

For example, scientists at the Jet Propulsion Laboratory predicted the four-year orbit of the asteroid Toutatis to within 30 kilometers.

In those four years, Toutatis traveled 8.5 billion kilometers.

Its prediction accuracy is 0.000000004

(Laughter) The reason I have this beautiful piece of this asteroid is because, like all other bodies near the Earth, asteroids make unexpected visits.

(Laughter) Three years ago today, a small asteroid hit Chelyabinsk, Russia.

It was about 19 meters in diameter, about the size of a convenience store.

An object this size hits the Earth once every 50 years or so.

Sixty-six million years ago, a much larger asteroid hit Earth, causing a mass extinction of life on Earth.

Seventy-five percent of the plants and animals died, and that includes, unfortunately, the dinosaurs.

The asteroid was about 10 kilometers in diameter, and 10 kilometers is the altitude at which a Boeing 747 flies.

Next time you're on a plane, look out the window and imagine a huge rock on the ground rubbing against the plane's wing.

It's so big it will take you a minute to pass

An asteroid of that size collided with the earth.

It wasn't until my time that asteroids were considered a credible threat to the planet.

Since then, efforts have been made to discover asteroids and set records.

I am fortunate to be part of such research.

I'm part of a team of scientists using NASA's NEOWISE infrared telescope.

NEOWISE was not created to search for asteroids.

It was originally built to orbit the Earth, probe the far reaches of our solar system, and explore the coldest stars and brightest galaxies.

It worked just as it was designed for seven months.

6 years later it's still working

It continues to be repurposed and used for asteroid discovery and research.

It's a wonderful little space robot, but now it's in used car condition.

We've run out of coolant to cool the sensors long ago, so we joke that the air conditioner is broken.

The odometer is showing 1.48 billion kilometers, but it's still working perfectly, taking a solid image every 11 seconds.

I've taken 23 photos since I started talking here.

What makes NEOWISE so valuable is its ability to observe thermal infrared.

So NEOWISE doesn't look at the sun's light reflected off the asteroid, but the heat it gives off.

This is a very important ability, because some asteroids are black, like coal, and they're hard, even impossible, to spot with other telescopes.

No matter how dark the asteroid is, it looks bright to NEOWISE.

Astronomers are discovering and studying asteroids with every technology at hand.

2010 Reached historic stage

NASA has discovered more than 90 percent of asteroids larger than one kilometer in diameter that could wreak havoc on Earth.

But that's not all

Anything 140 meters or more would wipe out a normal-sized country.

Only 25 percent of such asteroids have ever been discovered.

We must continue to search the universe for near-Earth asteroids.

Only humans can understand calculus and build telescopes.

We know how to find these asteroids.

this is our responsibility

With early warning and early detection of dangerous asteroids, orbital changes are possible.

Unlike earthquakes, hurricanes, and volcanic eruptions, asteroid impacts can be avoided with precision prediction.

What we need to do now is create a space map of the near-Earth.

We still need space exploration

thank you

(applause)

Three months after I was pregnant with my twins, my husband, Ross, and I went to the hospital for a second ultrasound.

I was 35 years old at the time, and I knew that I was at a high risk of having a child with a birth defect.

So Ross and I were looking at common birth defects and thought we were prepared for that.

But what I was actually told was a diagnosis that it was a rare occurrence, and I didn't think about it that far.

One of the twins, Thomas, was told by a doctor that he had anencephaly, a serious birth defect.

His brain didn't form properly because part of his skull was missing.

In the case of fetuses with anencephaly, most of them die in the womb, and even if they are born, they only live for minutes, hours, days.

On the other hand, another son, Calum, appeared to be developing well as far as the doctors could see. Thomas and Calum are identical twins, genetically identical.

Why did this happen? My husband and I bombarded the doctor with questions, and he suggested that we reduce the size of the fetus. Although it was possible to do that, we heard that it would pose new risks to both the healthy fetus and the mother.

At this point, I was three months pregnant, with just over six months to go before I gave birth, and I had to live with my blood pressure and stress under strict control.

All through my pregnancy, I felt like I was living with a gun at my fingertips.

But I kept staring at the barrel and saw a light at the end of the tunnel.

Even though he couldn't prevent sad things from happening, Thomas' short life inspired him to find ways to leave a positive impact on the world.

First, I talked to a nurse about donating eyes, tissues, organs.

The nurse contacted an organ transplant organization, the local Organ Transplantation Council (WRTC).

The WRTC explained, "Thomas at birth would be too small to donate his organs for a transplant." It was a shock to me, to the dismay of being rejected for an unexpected reason.

WRTC suggested, "If it's for research purposes, we can provide it."

A new light was shed on Thomas.

I began to believe that, despite the weighty truth of a fetus with birth defects, Thomas held the key to unlocking a medical mystery.

Both twins were born healthy on March 23, 2010.

In the end, it worked out just as the doctors had predicted. Thomas was missing the top of his skull, but he was able to drink from a bottle.

Six days later, Thomas died in his husband's arms, and my family and I stood beside him.

Shortly after that, I contacted the WRTC, and they picked me up at my house and took Thomas to the Children's National Medical Center.

A few hours later, we got word that Thomas' organs had been successfully harvested, and Thomas' organs and tissues were being donated to four research institutions.

Umbilical cord blood to Duke University

Liver to Cytonet, a Durham-based cell therapy company

The cornea was sent to the Skepence Eye Institute, an affiliate of the Harvard Medical School, and the retina to the University of Pennsylvania.

A few days later, we held Thomas's funeral with just the immediate family, and Calum was with us.

But my heart was complicated, "What happened after that?

What kind of research is being done?

Did it make sense to provide tissues? "and

Around that time, my husband and I were invited to a "family reunion" organized by the WRTC, where we met 15 grieving families who had donated the bodies of their loved ones for organ transplants.

At that gathering, I heard that some families received letters from organ recipients thanking their donors.

I also learned that if both parties agreed to a waiver, they could meet in person, similar to adoption.

This story lifted my spirits, and I thought I'd write a letter myself, wanting to know how Thomas' body was used.

But I was disappointed again, because this system was also limited to organ transplants.

I was envious of organ transplants, to the point of being jealous.

(Laughter) Over the next few years, I continued to study organ and tissue donation, and eventually got a job in this field.

One day I suddenly had an idea

I finally wrote an email, "Sorry for the suddenness.

I'm the mother of that newborn baby, and I've been wondering how you're using the retinas I donated in March of 2010 to your research.

I sent this email to the eye bank that brokered the cornea donation, which is the Virginia Eye Care Fund, and I also asked them to forward the email to the person concerned.

I received the following reply: "This is the first time I've received such a request, so I can't promise a reply, but since there is no problem with the contact itself, I will forward it to the target institution."

Two days later, I received a new reply from Dr. Alpa Ganguly of the University of Pennsylvania.

The email began with words of thanks, and then he explained his specialty, retinoblastoma, which is a deadly "retinal cancer" that occurs most often in children under the age of five. Finally, he invited us to his lab.

So I spoke with Dr. Ian on the phone, and the first thing he said was, "I can't imagine how your family is feeling. Thomas made the most precious sacrifice. My heart goes out to all the donors."

I replied, "I have no objection to your research. The reason you used my son's tissues was

It's a match decided by the organization that mediates tissue provision.

And above all, there are many children suffering from illness right now.

Being able to participate in the research gave Thomas a new meaning to his birth.

So please don't feel sorry for him."

"Donating a retina is rare," he said.

After submitting a request for the use of the retina to the NDRI, an organization that specializes in human tissues, he waited six years.

There was only one case that met our criteria, and that was Thomas.

Then, my professor and I discussed the day we would visit the lab, and we decided on March 23, 2015, the twins' birthday.

After the call, I emailed a picture of Thomas and Calum, and this T-shirt arrived a few weeks later with a letter from my teacher.

A few more months later, my family of three got in the car and drove to the lab.

In the lab, I was greeted by the professor and his staff, who told me that talking to me was a weight off their shoulders.

He also had a secret codename.

It's like calling Henrietta Lacks "HeLa." Thomas' codename is "RES 360."

"RES" is an abbreviation for "research use," and "360" means the 360th sample, the number of samples collected in nearly a decade.

Also, the teacher showed me a rare document, the shipping slip, that was for the delivery of the retinas from Washington, D.C. to Philadelphia.

Now we cherish this slip like a family heirloom.

It's like the medals and marriage certificates you get when you go to war.

He explained that he was using Thomas' retina and RNA for research aimed at deactivating genes that form tumors, and he even showed me the results of his work with the RES 360.

Next, we were ushered into the freezer, and the teacher handed us two samples, labeled "RES 360."

There were two small samples left.

It seems that it was left because there is no prospect of when it will be provided next time.

Then we moved to the conference room and had lunch together and had a good time together.

Experimental equipment set for children

I was also invited to an internship

(Laughter) Finally, I would like to leave you with two simple messages.

One is, most of you would never even consider donating your organs to a research institution.

I was like that too, so I consider myself to be a normal human being.

but i did

It was a good experience and I would recommend it to everyone.It brought peace to our family.

And the other thing is, if you're working with human tissue, I'd like you to write me a letter when you suddenly think about a donor or their family.

I've received your tissue. Please let me know about your research as well.

I would like to ask you something more

If a donor family visits the lab and the visit goes well, please let me know.

Continuing my own story, we ended up receiving Thomas' organization -- we visited all four institutions.

I met some amazing people working on cutting-edge research.

Thomas has his own way of getting into all the big names: Harvard, Duke, Pennsylvania.

Thomas is needed by those people.

At times I thought his life was short and fragile, but now I think he's been involved in a very important job for a long time.

I also want to continue activities that help someone for a long time.

thank you

(applause)

Perhaps unsurprisingly, I don't want to be in a hospital, and I don't want to go to a hospital.

you?

Many of you feel the same way, right?

But why? Why do we hate hospitals?

Is this inevitable in life?

A bland meal?

High parking fees?

A peculiar smell?

Or fear of the unknown?

It's all there and there's more

Patients are often forced to travel long distances to get to the nearest hospital, and access to hospital care is a major challenge, and it's a problem in rural areas and in the United States, but also in Sweden, which is sparsely populated.

Even where hospitals are plentiful, the poor and the elderly typically lack convenient, affordable transportation to get medical care.

And many people avoid hospitals because of cost, and because of that, they don't get proper care.

64% of Americans avoid hospital visits because of cost

Even with further treatment, hospitals sometimes exacerbate the disease.

Medical error is the third leading cause of death in the United States, and it's the third leading cause of death after cancer and heart disease.

After working in health care for over 20 years, I see all the time how the hospital system is falling apart and dying.

let me give you two examples

40% of Japanese doctors, half of American doctors are burnt out.

In my home country, the Netherlands, there are only 17 million people.

There will be a shortfall of 125,000 nurses in the next few years.

How did you come up with the idea of ​​cramming sick people into one building in the first place?

Let's go back to ancient Greece

In 400 BC, a healing temple was built, and people would go there for diagnosis, for treatment, and for healing.

For the next 2,000 years, there were religious asylums, right up until the industrial revolution, when assembly-line hospitals were built on the principles of the industrial revolution, streamlining them to get products -- in this case, patients -- out of hospitals as quickly as possible.

There have been some interesting innovations in the last century.

Discovered how to make insulin

We invented cardiac pacemakers and X-ray imaging, and we've ushered in the wonderful era of cell and gene therapy.

But the biggest change, which is to fundamentally improve the hospital system, is still a long way off.

And I believe now is our chance to reinvent the hospital system once and for all, and clean up the current system.

We're creating a whole new system that's going to revolutionize home health care.

A recent study reported that 46% of in-hospital care could be done at the patient's home.

very high percentage

It's mostly for chronically ill patients

So hospitals can and should be reduced to small, mobile, mobile medical centers dedicated to acute care.

I think neonatal care, intensive care, surgery and imaging will remain in hospitals, at least for the foreseeable future.

A few weeks ago, I met with a colleague, whose mother had been diagnosed with terminal cancer, and said, "Nils, you're in trouble.

It's been hard since I found out my mother only has a few months left to live.

Instead of playing with my grandchildren, I now have to go on excursions three times a week, two hours each way to Amsterdam, just for treatment and tests."

My chest ached. Professional nurses already know what they can do at home, at least for blood draws, right?

If she could have been tested and treated at home, she could have done something very important in her last few months.

My biological mother is 82 years old, and the reason she avoids going to the hospital is because it's hard to plan and manage her itinerary.

My sister and I will help you there.

But there are many other seniors who avoid medical care, and waiting too long to the point of life-threatening inevitably ends up in expensive intensive care.

Dr. Kovinsky, a medical researcher at the University of California, has concluded that a third of patients over the age of 70 and more than half of patients over the age of 85 leave the hospital in worse condition than when they started.

And the real question — the question many patients face when going to the hospital is, where would you go with your best buddy? Where to go with your dog is

By the way, this is our dog, isn't it cute?

(Laughter) It's not just a question of convenience.

It's about unnecessary hospitalizations and unnecessary costs.

This is Art, a friend of mine. He recently had to be hospitalized for a minor surgery, which forced him to stay for more than two weeks because he needed an intravenous drip of certain antibiotics.

I spent two weeks in a hospital bed, costing over 1,000 euros a day.

It's nonsense

These costs are the crux of the problem.

What we're seeing a lot in the global economy over the last few years is that healthcare spending as a percentage of GDP has continued to rise.

As you can see, over the last 50 years, health care costs in Germany have risen from about 5% to 11%.

In the United States, where it was 6%, it's now over 17%.

A large part of that cost is the cost of building large, glamorous hospitals.

And those buildings are inflexible, leaving a system in which beds need to be filled in order for the hospital to run efficiently.

Hospitals have absolutely no incentive to operate with fewer beds.

Just thinking about it makes me sick, right?

So, my friend Art's home care costs are about a tenth of what hospital care costs.

this is the direction we are heading

The hospital beds of the future will be in our own homes.

it has already started

Globally, home health care is growing 10% each year.

From my own experience, mobility and technology make home health care work.

Science and technology has made it possible to do medical care outside of hospitals that was previously only possible in hospitals.

Diagnostic tests like blood draws, blood glucose tests, urine tests, etc. are now available in the comfort of your own home.

As more and more connected devices, like pacemakers and insulin dispensers, will be able to notify you before you need care.

Together, these technologies will give us a better picture of a patient's health, and all of that information will lead to better management and reduce medical errors, the third leading cause of death in the United States.

I see it in my daily work

My job is logistics, but I think home health care works well.

I have a driver to bring medicines to a patient's home.

A nurse accompanies me to administer medication at the patient's home.

it's easy

remember my friend art

He can get an antibiotic drip in the comfort of his own home, no hospital clothes, no bland hospital food, no risk of contracting antibiotic-resistant bacteria in the hospital.

But it doesn't stop there

Older people can get the care they need in the comfort of their own homes, in the presence of irreplaceable companions.

No more driving for hours just to get a procedure or test.

In the Netherlands and Denmark, we have very good examples of cancer treatment clinics that give chemotherapy in the patient's home, sometimes with fellow patients coming together to perform the procedure.

The greatest improvements seen in these patients were reduced stress and improved anxiety and depression.

Home health care also helps patients regain a sense of normalcy, regains freedom in their lives, and in such a state allows them to forget their illness.

We've been talking about home health care, but what if I don't have a home, or I'm homeless, or I have a home, but no one to look after me, or no one to take me in?

That's where the sharing economy, or Airbnb for home care, comes in.

In the Netherlands, churches and care organizations work together to connect people who need care and companionship with collaborators who have homes for that purpose and who can provide care and companionship.

Home health care is cheap, easy to facilitate, quick to set up, and it's safer, quicker, and cheaper to set it up at home, even in a humanitarian crisis, like in the suburbs that I've talked about.

Home health care is perfect for wealthy neighborhoods, but it's also applicable in less fortunate communities.

Home health care works in developed countries, it works in developing countries.

That's why I'm passionate about making it easier for patients to improve their lives through home health care.

I'm passionate about helping seniors get the care they need, in the comfort of their own homes, with their best companions sitting by their side.

I'm passionate about making that change and making sure that the patients themselves are able to regain their lives, unencumbered by their disease.

To me, that means medical care at home.

thank you

(applause)

Design is a vague and elusive phenomenon that can mean many different things at different times.

But all truly inspiring designs have one thing in common: they start with a dream.

The bolder the dream, the greater the design effort required to make it a reality.

So the best designers are usually the best dreamers, rebels and mavericks.

Examples of this can be found throughout history. Let's go back to 300 B.C., when a 13-year-old boy became the king of a small impoverished country on the outskirts of Asia.

The boy dreamed of gaining territory, wealth and power through military might.

And the boy's design skills are unexpectedly necessary to achieve his dreams.

Back then, all the weapons were handmade, and each one had different specs.

So in combat, when one archer ran out of arrows, it wasn't always possible to shoot another archer's arrows with his own bow.

Of course, this isn't practical, and it leaves you vulnerable to attack.

In order to solve this problem, the first emperor unified the design of all bows and arrows, making them interchangeable.

And they did the same with swords, axes, spears, shields, and all other forms of weapons.

With his mighty equipment, his army won battle after battle, and within fifteen years his small kingdom succeeded in conquering the wealthy and powerful surrounding powers, creating a mighty Chinese dynasty.

Of course, at the time, no one would have thought to call the first emperor a designer. Why?

He used design unwittingly and instinctively, but with great ingenuity, to achieve his goals.

There's also an unexpected, accidental designer who was willing to go to great lengths to get what he wanted.

His name is Edward Teach, the British pirate Blackbeard.

During the Golden Age of Piracy, Teach and other pirates threatened the high seas.

Colonial trade flourished, piracy was quite lucrative.

Astute pirates figured that in order to increase their loot, they had to scare their opponents as much as possible when raiding ships so that they would surrender at the sight of them.

In other words, they were able to get the ship without wasting ammunition and without causing any casualties.

Edward Teach redesigned himself as Blackbeard to play the role of a ruthless ruffian.

He wore a thick coat and a big hat to emphasize his height.

A black bushy beard obscured his face

Lower the gun belt with several pistols from each shoulder

In addition, a flaming fuse was attached to the edge of the hat, making a hissing sound to intimidate the enemy when attacking a ship.

Like many pirates of his time, he carried a flag bearing an eerie symbol: a skull and two crossed bones. This motif symbolized death in many cultures for centuries.

Of course, the sensible crew surrendered at first sight.

So Edward Teach and his fellow pirates are the pioneers of modern communication design. And their symbol of death -- (Laughter) there's still a long way to go -- their skull and crossed bones symbol of death is perhaps the forerunner of today's logos, just like the big red letters behind me.

(Laughter) But design was also used for a higher purpose, and that was an equally talented and equally surprising designer, Florence Nightingale, a 19th-century English nurse.

Her mission was to provide appropriate medical care for all.

She was born into an upper-class, wealthy family in England, so her family was shocked when she volunteered to work in a barracks hospital during the Crimean War.

On the ground, she quickly realized that in the filthy, stinking hospital wards, more people died from infectious diseases than from war wounds.

So she campaigned to design and build a clean, bright, airy clinic.

She returned to England and started another campaign, this time with private hospitals, arguing that the same design principles should be applied there.

The so-called Nightingale Ward would dominate hospital design in the decades that followed, and elements of it are still in use today.

But by this time, design was seen as a tool of the industrial age.

Design became a recognized profession, but it was restricted to a specific role and was generally used to pursue commercial ends, rather than being used as intuitively as Nightingale, Blackbeard, or the First Emperor.

By the 20th century, the tide of commercialism was gaining strength, and designers who strayed from it could be seen as eccentric or dangerous.

One such designer is one of my greatest design heroes, the talented Moholy-Nagy Laszlo.

He was a Hungarian artist and designer, and his experiments with the effects of technology on everyday life were so compelling that they still influence the design of digital images like our phones and computer screens.

He transformed Germany's Bauhaus into a progressive school in the 1920s, but when he later scrambled to open the New Bauhaus in Chicago, some of his former colleagues shunned him.

Moholy's ideas were as bold and edgy as ever, but his approach to design was too experimental and, as he puts it, "an attitude, not a profession," to keep up with the times.

And sadly, the same thing happened to another design maverick, Buckminster Fuller.

He was a gifted design idealist and design activist, and his primary focus was on designing sustainable societies, and his methods were so forward-thinking that he began talking about the importance of environmentalism in the design industry in the 1920s.

But despite his efforts, he was justifiably dismissed as a freak by the design authorities. Certainly, his experiments failed.

But the "geodesic dome" is a design structure for building emergency shelters, made from scraps of wood, metal, plastic, scraps of wood, old blankets, plastic sheeting -- whatever's available at the time -- it's one of the greatest feats of humanitarian design, and has since provided much-needed shelter to millions of desperate people.

Now, it was the courage and passion of forward-thinking designers like Fuller and Moholy that led me to design.

I started out as a news reporter and foreign correspondent.

I wrote articles about politics, economics, business intelligence, and I could have chosen any subject as my specialty.

I chose design because I believe that design is the most influential tool you can choose to improve your quality of life.

Thank you TED design freaks

(Applause) I greatly admire the work of professional designers as outstanding and extraordinary, and equally, I believe that design benefits greatly from the uniqueness, free-thinking and resourcefulness of rebels and mavericks.

It's a remarkable time for the design world, as the pros and the mavericks are getting closer to each other.

Fundamental advances in digital technology are giving designers the freedom to operate both within and outside the commercial context, to pursue ever more ambitious and far-reaching objectives.

Theoretically, crowdfunding, cloud computing, social media, and so on will give professional designers more freedom, and designers who are not bound by professional boundaries will get more funding and, hopefully, more response to their designs.

My favorite example of this kind of activity is in Africa, where a new generation of designers is developing incredible Internet of Things technologies and implementing Florence Nightingale's dream of improving healthcare. In African countries, there are more people with mobile phones than with clean running water.

One of them is Arthur Zang.

He's a young Cameroonian design engineer who's taken a tablet and turned it into a "cardio pad," which is a mobile heart monitor.

It can be used to monitor the heart of patients in remote rural areas.

That data is sent over the cellular network to well-equipped hospitals hundreds of miles away for analysis.

When a specialist finds a problem, he suggests an appropriate treatment.

This would save many patients from the long, difficult, costly and sometimes pointless trip to the hospital, and the "cardio pads" would allow us to actually examine a patient's heart.

Zhang has been developing "cardio pads" for eight years, during his final year of college.

But he didn't get the investment to start the project from traditional sources.

So I posted it on Facebook, and a Cameroonian government official saw it and managed to get a research grant from the government.

He's now developing not just "cardio pads", but mobile medical devices to treat a variety of other conditions.

He and many other talented and enterprising designers are working on some amazing original projects.

Finally, I would like to share with you just a few examples of such designers.

The first is "peak vision."

This is a group of Kenyan doctors and designers who have developed their own Internet of Things technology to develop a mobile eye exam kit.

Another is Gabriel Maher, who has developed a new design language that allows her to express the nuances of changing gender identities. She designs without relying on traditional preconceived notions.

In addition to the designers I've just introduced, many are pursuing their dreams of making the most of their newfound freedom, using the knowledge and experience of professional designers and the wit of rebels and mavericks.

and we all benefit

Thank you for listening

(applause)

I'm going to talk about gene drives, but first, let me give you a little background.

Twenty years ago, a biologist named Anthony James was obsessed with the idea of ​​creating a malaria-free mosquito.

A great idea, but it didn't quite work.

For one thing, it's extremely difficult to create malaria-resistant mosquitoes.

In the end, he did, just a few years ago, by inserting a gene that prevented the malaria parasite from living inside the mosquito.

But this raises another issue

Now that we have a malaria-resistant mosquito, how do we replace it with a malaria-carrying mosquito?

You have a few options. Plan A is basically to breed the new genetically engineered mosquitoes in large numbers and release them into the wild in the hope that they will pass on the genes.

The problem is that for this to work, you have to release ten times as many mosquitoes as there are wild mosquitoes.

So a village with 10,000 mosquitoes will release 100,000 mosquitoes.

As you can see, this was not a very welcome move for the residents.

(Laughter) Last January, Anthony James received an email from a biologist named Ethan Beer.

Bia and her graduate student, Valentino Ganz, say they've found a tool that can make certain genetic traits not only inherited, but spread very quickly.

If that's true, it solves a problem that James has been grappling with for 20 years.

So they tried out two mosquitoes with a malaria resistance gene and a new tool called a gene drive, which I'll talk about later.

They then engineered mosquitoes that inherited the malaria resistance gene to have red eyes instead of the usual white.

This is for convenience so that you can tell at a glance which is which.

We put the two malaria-resistant red-eyed mosquitoes into a box with 30 normal white-eyed mosquitoes and bred them.

After two generations, 3,800 grandchildren were born.

this is not surprising

Here's where the surprise comes in. If you started with just two red-eyed mosquitoes and 30 white-eyed mosquitoes, you'd think most of your offspring would be white-eyed.

But when James opened the box, all 3,800 mosquitoes had red eyes.

When I asked Ethan Beer about this moment, he was so excited that he was screaming on the other end of the phone.

Because to say that only red-eyed mosquitoes can do it goes against Mendelian genetics, which is the most basic of biology.

In a nutshell, according to Mendelian genetics, when a male and female mate, the offspring inherits half of their DNA from each parent.

If the original mosquito is type aa, and the new mosquito is type aB, which has the malaria resistance gene B, it will produce offspring in four different permutations: type aa type aB type aa type Ba.

But with the gene drive, they all became type aB.

It should be biologically impossible

How did that happen?

The first is the emergence of a gene-editing tool called CRISPR in 2012.

I'm sure many of you have heard of CRISPR, so let's just say briefly that CRISPR is a tool that allows researchers to edit genes easily, quickly and precisely.

using a mechanism that originally existed in bacteria,

It's basically a protein that acts as a pair of scissors to cut out the DNA, and an RNA molecule that directs the scissors where you want them on the genome.

The result is something like a genetic word processor.

You can take whole genes out, you can embed whole genes, you can even edit a single letter in a gene.

And it works for almost any species.

Remember when I said that gene drives originally had two conundrums?

The first is that it's difficult to create mosquitoes that are resistant to malaria.

This is basically solved thanks to CRISPR

Another issue is logistics.

How do we spread traits?

need a clever way

Two years ago, Harvard biologist Kevin Esvelt wondered what would happen if we could embed not only a new gene of interest, but also a cut-and-paste mechanism into CRISPR.

In other words, let CRISPR copy and paste itself as well.

We'll have a gene-editing machine that never stops.

and that's exactly what happened

Esvelt's CRISPR gene drive not only ensures that traits are inherited, but when used in germ cells, it automatically copies the new gene onto both chromosomes of every offspring.

It's kind of like a global replacement, or in scientific terms, homozygous for a heterozygous trait.

What does this mean?

For one thing, we've got a new tool that's both incredibly powerful and worrying.

So far, I'm rather relieved that gene drives haven't worked so well.

Messing around with an organism's genes usually results in a loss of evolutionary fitness.

So biologists can create mutant fruit flies without any worries.

After a few escape, natural selection will take care of the rest.

What makes gene drives remarkable, powerful, and scary is that they no longer hold.

Unless the given trait has a major evolutionary flaw, like a flightless mosquito, the CRISPR gene drive will continue to spread inexorably until the trait reaches every individual in the population.

Making a working gene drive isn't easy, but James and Esvelt believe it's possible.

The good news is that this opens the door to some pretty amazing things.

Putting a malaria resistance gene drive into just one percent of the malaria-carrying Anopheles mosquitoes, researchers estimate, would spread the entire population in a year.

We may be able to eradicate malaria in just one year.

Practically speaking, it's going to be years before we can do that, but we know that thousands of children die every day from malaria.

We can get it to almost zero in a year.

The same goes for dengue, chikungunya, yellow fever.

there is more

Eliminate invasive alien species — say, if you want to keep Asian carp out of the North American Great Lakes

We just release a gene drive that ensures that only males are born.

After a few generations there will be no females and the carp will disappear.

In theory, it would restore hundreds of native species that had been pushed to the brink of extinction.

That's the good news, but there's also bad news.

Gene drives are extremely effective and, if accidentally released, can change entire species, and very quickly.

Anthony James took good precautions

They were breeding mosquitoes in biologically contained labs, using species not found in the United States, so if they escaped, they would have no mates to mate with and would just die.

But if, by some mistake, 10 or so Asian carp with a gene drive that produces only males were brought to Asia from the Great Lakes, we might wipe out Asia's wild carp.

In today's connected world, I wouldn't call it improbable.

That's why we have the problem of invasive alien species in the first place.

assuming the fish is still good

Mosquitoes and fruit flies can't be trapped.

Whether it's borders or the sea, we'll cross over

The other bad news is that gene drives don't always stay within the target species.

Because of gene flow, which means that closely related species can interbreed.

Then the gene drive might spread across species, from Asian carp to other carp species.

If gene drives just spread traits like eye color, so much the better.

In fact, there's a good chance we'll see some really weird fruit fly outbreaks in the near future.

If gene drives were designed to kill species, it could be a disaster.

The last thing to worry about is that the technology to genetically engineer and put in a gene drive is basically the kind of thing that any laboratory in the world can do.

Even undergraduate students can do it

Even a good high school student can do it with the right equipment.

You're starting to feel a little scared, aren't you?

(Laughter) Interestingly, most of the scientists I spoke with didn't seem to think gene drives were scary or dangerous.

Partly because they believe that if you're a scientist, you're supposed to do it responsibly and carefully.

(Laughter) So far, it hasn't betrayed me.

But gene drives also have their limitations.

For one thing, it can only be used in species that reproduce sexually.

So, thankfully, it can't be used to create viruses or bacteria.

And traits only spread from generation to generation.

Changing or eradicating entire species would only really happen in species with very short reproductive cycles, like insects and small vertebrates like mice and fish.

It would take centuries for a trait to become widespread enough to matter in elephants or humans.

And even with CRISPR, it's not easy to create truly devastating traits.

Suppose, for example, that we wanted to create fruit flies that would eat normal fruit instead of rotten fruit, to hurt American agriculture.

First, we need to identify the genes that control what flies want to eat, and this alone would be a fairly long and difficult project.

Then you'd have to change the fly's genes to change its behavior, which would be a longer and more difficult project.

And it can go wrong, because the genes that control behavior are complex.

So if a terrorist were to choose between undertaking years of meticulous basic research that could go awry, or simply blowing it up with a bomb.

I would probably choose the latter

Especially when you consider that it's theoretically very easy to build what's called a "reversal drive."

Reversal drives overwrite changes caused by gene drives

So if you don't like the changes your gene drive makes, all you have to do is unleash a second drive that dismisses it, at least in theory.

where are we?

Now we have the power to change whole seeds

Is that what you should do?

Have we become gods?

i don't know that

I can say this: First, very smart people are still debating how to regulate gene drives.

At the same time, other very smart people are working to create safeguards that allow gene drives to self-regulate, to decline and disappear in a few generations.

this is great

Still, we need a dialogue about this technology.

Given the nature of gene drives, this dialogue needs to be global.

What if you want to use Kenya but don't want to use Tanzania?

Who will make the decision to release a flying gene drive?

i don't have the answer to this question

The path forward for us now is to openly discuss risks and rewards and take responsibility for our choices.

This choice not only includes the choice to use the gene drive, but also the choice not to use it.

People tend to think that maintaining the status quo is the safest option.

but that's not always the case

Gene drives are risky and controversial, but malaria is here and kills a thousand people every day.

Countering it with pesticide spraying does a lot of damage to other species, including amphibians and birds.

So when you hear about gene drives in the coming months -- and I'm sure you'll hear about them -- remember that.

Acting can be scary, but inaction is often worse.

(applause)

Imagine my memories, what if I could invent a device that could record my dreams, my ideas, and tell it to my brain?

Could this technology be a game-changer?

But in fact, humans already have such a mechanism, which we call the Human Communication System and Effective Conversation.

To understand how this works, let's look at how the brain works.

First, let's look at this problem in a slightly different direction.

To do that, you have to understand how the neuronal response patterns associated with memories and ideas in my brain are transmitted to your brain.

We believe that two factors make communication possible.

First, your brain is physically interlocked by the sound waves that I'm sending to your brain right now.

Second, humans have evolved common neural signaling patterns that enable communication.

How do you know that?

In my lab at Princeton University, I had people come in, and I scanned their brains with fMRI while they were telling stories and listening to things that happened in real life.

To give you an idea of ​​what kind of story I used to stimulate my brain, I'd like you to listen to the story I used at that time for just 20 seconds, told by the great storyteller Jim O'Grady.

(Sound) (Jim) "So I wrote that scoop, and it's a good story, so I thought I'd make it better. (Laughter) I started embellishing the story.

If you were a reporter, you would call this a "fake"

(Laughter) They say it's a line that shouldn't be crossed.

But I crossed another line and witnessed a powerful dean being hit with a pie.

It's the type of story I like."

So let's take a look at what's going on in your brain when you hear stories like this.

Let's start simple, let's focus on one part of a listener's brain, the auditory cortex, which processes sounds coming in through the ears.

As you can see, in this particular part of the brain, the signals go up and down as the story unfolds.

Compare this response to that of another listener in the same area of ​​the brain.

It raises questions like, "How similar are all listeners' responses?"

Learn about our five listeners

Before we started talking, I started scanning their brains, just lying in the dark waiting for the story to start.

As you can see, the signals in this part of the brain in everyone go up and down, but the signals are different and out of sync.

But as soon as the story begins, interesting things start to happen.

(playback) "So I wrote that scoop article -- and --" As you can see, all the subjects were focused on the story, and all the listeners' responses came in very similar up-and-down signals.

Exactly the same thing is happening in your head as you listen to me.

This phenomenon is called brainwave entrainment.

To explain brainwave entrainment, let me first explain the phenomenon of pendulum synchronization.

There are 5 metronome

Think of this as five brains

Like the listener before you start speaking, the metronome is ticking, but not in time.

(metronome sound) Now let's put the two wheels down and make them work together.

(Metronome sound) The two wheels begin to rock

The vibrations caused by this shaking are transmitted through the board, and all the metronomes begin to synchronize.

Listen for the ticking sound

(Synchronized sound) This is what we call pendulum synchronization.

So back to the brain, what drives EEG entrainment?

Is it simply the sound waves emitted by the speaker?

or maybe words

It can also be the meaning that the speaker is trying to convey.

To investigate this, we conducted the following experiment

First, let's play the story backwards.

It retains its original acoustic character, but loses its meaning.

sounds like this

(playback) (incomprehensible audio) Now, I've colored the areas in the brains of the two people that respond very similarly.

As you can see, the incoming sound entrains, or synchronizes, the auditory cortex that processes sound in all brains, but it doesn't spread deep into the brain.

Now let's use this sound to help you understand the words.

If you randomly change the order of what Jim said, you'll end up with a string of words.

(Playback sound) "-Animals-Classified Facts-

That's right - pie man - possibility - my story." With these words, the sensory language area also begins to synchronize, but it doesn't expand beyond that.

Now let's construct a sentence from the words

(sound played) "And I would advise you not to cross that line.

He said, 'Jim, that was a good story.

She only knows him through my story, right? ’”

All of the language areas that now process the incoming language are either synchronized or exhibit similar responses between all listeners.

But it's only when you hear an engaging, coherent whole story that synchronization spreads deep into the brain, in the higher areas, including the frontal and parietal lobes, and all of these areas respond in very similar ways.

We believe that the evoking of these responses in the higher realms, and the similarity of listener responses, is due not to the words or sounds the speaker utters, but to the meaning conveyed.

If this idea is correct, we can predict the future with certainty. If I were to speak the exact same idea in two different languages, your brains would still react in a similar way.

To test this, we ran the following experiment in the lab.

I took a story written in English and translated it into Russian.

They're two languages ​​with different pronunciations and systems, but they convey exactly the same message.

If you tell a story written in English to a native English-speaking listener, and you tell a story in Russian to a Russian-speaking listener, you can compare the reactions between these groups.

When we tried it, we found no similarity in response in the auditory cortex, which is associated with language, because the language and the sounds are completely different.

But there were similarities across populations in responses in higher areas.

We believe it's because the story was understood in exactly the same way, and this was confirmed in tests after the story was finished.

I think this kind of synchronization is necessary for communication.

For example, as you can see, I'm not a native English speaker.

I grew up with a different language, but I'm sure many of you are.

We can still communicate

how?

I think it's because we have this common code of meaning that we can communicate.

So far, I've only talked about what's going on in the listener's brain when they're listening.

What is going on in my brain as the speaker?

To look inside the speaker's brain, we had the speaker go inside a scanner, and we scanned his brain and compared how his brain reacted to what the listener's brain reacted to when he was listening.

Be aware that speaking and understanding are very different processes.

So the question is, how similar do you think they are?

Surprisingly, this complex pattern of listeners was also found in the brains of speakers.

Speaking and understanding depend on very similar processes.

And what we found was that the more similar the listener's brain response to the speaker's brain response, the better the communication.

If you don't understand me at all -- and I hope you don't -- your brain will react very differently than mine.

But if you understand what I'm saying, your brain reacts very much like mine.

Now that I have these findings, the question is, how do I transfer to you one memory that I have?

So I did the following experiment.

We asked the subjects to watch a never-before-seen episode of the BBC series "Sherlock," while their brains were scanned.

I put them in the scanner again and had another person who had never seen the story tell the story.

say specifically

It was in this scene that Sherlock climbed into a London carriage driven by the killer he was looking for.

As I watched this scene, my brain reacted in a certain pattern.

And now, that very same pattern is replayed in my head by telling the scene: Sherlock, London, murderer.

When I say these words to you now, you're going to recreate the scene in your mind.

I'm sure that pattern is emerging in your brain.

We were very surprised to learn that the patterns in your brains when I was talking about this scene were very similar to the patterns I had when I was in the scanner watching this show a few months ago.

From this, we begin to understand the mechanisms by which we tell stories and convey information.

Because, for example, right now you're listening and trying to understand what I'm saying.

it's not easy

But I hope that at some point in the story, it clicked and you got it.

So hours, days, months later, if you meet someone at a party and tell them about this lecture, all of a sudden that person feels like you're here.

I think we'll see how this mechanism allows us to transfer memories and knowledge to others. Isn't that wonderful?

But our ability to communicate depends on how much common ground we have.

Because, for example, if I used the British term "hackney carriage" instead of "cab," many of you in the audience here wouldn't understand.

So brainwave synchrony depends not only on the ability to understand basic concepts, but also on the ability to increase common background, understanding, and shared beliefs.

Because on many occasions, people can have completely different understandings of the exact same story.

To test it in the lab, we did the following experiment.

In J.D. Salinger's novel, a husband loses his wife at a party, calls his best friend and asks, "Have you seen my wife?"

We told half of the subjects that their wives had affairs with their best friends.

I told the other half that their wives were loyal and that their husbands were very jealous.

That one sentence before you begin can change the response of your brain so much that everyone who believes their wife is having an affair will have a similar response in the higher brain areas, but a different one from the other group.

So, if a single word can make your brain respond in a way that is similar to one group, but completely different to another group, imagine how much of an effect this would have in the real world, because we're hearing the exact same news day after day, from different media outlets like Fox and the New York Times, but from different perspectives on the same fact.

In summary

If everything went as planned tonight, I could have made a sound that your brains would engage with.

It was through this connection that the patterns of brain response associated with my memories and ideas were transmitted to your brain.

In the process, we're beginning to uncover the neural mechanisms behind communication.

I believe that in the future this mechanism will improve and facilitate our communication.

The study also found that communication depends on a common background.

As a society, we may also have to keep in mind that when we lose our common background, we lose the ability to converse with people who think a little differently, because we're allowing a tiny minority of the media to use our microphones to manipulate and control our thinking.

I'm just a scientist, so I don't know for sure how to fix this.

But perhaps one way to do this is to go back to a more natural way of communicating -- where I don't just speak to you one-sidedly, but a more natural conversation -- where I'm both a speaker and a listener, and together we try to share perceptions and new ideas.

Because in the end, people who try to connect shape themselves.

Our desire to connect with other people's brains is a very basic thing that even early humans had.

I'd like to end with a personal example from myself, which I think is a great example of how our interactions with others shape us.

This is my son Jonathan when he was little

See how I developed a play on words with my mother, where there is only the desire and simple joy of responding to others.

(Both vocalize) (Laughter) My son's ability to connect with us and with other people in his life will shape his future personality.

And you, too, will be transformed by your interactions and interactions with the people you meet on a daily basis in your life.

stay connected with others

Keep spreading your ideas, because it's better when we all work together than when we all work apart.

Thank you

(applause)

I'm a conceptual artist, so I'm always looking for creative ways to create meaningful conversations.

We use paintings, sculptures, videos and performances.

But regardless of format, my favorite subjects are "history" and "dialogue."

In 2007, I made "Lotus." I painted a lotus flower on a piece of glass with a diameter of 2.3 meters and a weight of 270 kg.

In Buddhism, the lotus symbolizes enlightenment and purity of mind and soul.

But if you look closely at this lotus, each petal is a cross-section of a slave ship.

This iconic drawing is from the British Slave Transport Manual and was later used by abolitionists to show the cruelty of slavery.

In America, we tend to avoid talking about slavery and seeing it as a global industry.

But through Buddhist symbols, I want to universalize and sublimate the history and trauma of Black America to fuel discussion of our shared past.

I carved more than 6,000 people to create "Lotus"

Later, the City of New York commissioned an eight-and-a-half-meter version in steel as a permanent installation at Eagle Academy, a school for African Americans and Latinos, both of which are heavily influenced by this history.

They've been severely affected by the current situation, but let's change the subject for a moment.

I collect African wooden statues from souvenir shops and flea markets around the world.

Its provenance and authenticity are unknown, but everyone believes it has power and magic.

I recently came up with a way to make this work.

(Gunshot) Since 2012, Trayvon Martin, Michael Brown, Eric Garner, Sandra Bland, Tamir Rice and countless other unarmed African Americans have been murdered at the hands of police officers, who are often acquitted.

Thinking about their victims and also being law abiding, even I, a professor at a prestigious university, have had several encounters with police threatened at gunpoint.

I made a series of works, the title is one word "BAM"

The trick was to erase the individuality of the puppets and make them all look the same and uninteresting.

So he dipped the doll in dark brown wax, took it to the shooting range, and re-sculpted it with bullets.

It was fun to use big guns and high speed video cameras.

Respect for the doll made me hesitate to pull the trigger, for some reason I felt like I was going to shoot myself.

In the end, Raoul, the cameraman, took the shot.

I picked up the pieces and made a mold, first in wax and then cast in bronze, as you can see in this image, which bears the marks of violent production, almost like the scars of a battle.

When I recently exhibited this work in Miami, a woman complained that she felt like she could feel every bullet.

On the other hand, she felt that the film was a tribute not only to the victims of a series of murders, but also to the victims of racial violence throughout American history.

But "Lotus" and "BAM" aren't limited to American history.

Last year, while I was doing an exhibition in Berlin, a philosophy student asked me what caused a series of murders.

I showed him a postcard from the early 1900s depicting a lynching, pointing out that these murders have been going on for over 500 years.

Only through questions like his, and deep dialogues about history and race, can we progress as individuals and as a society.

My hope is that my work will create a safe haven of candid interaction and an opportunity for people to engage in much-needed dialogue.

thank you

(applause)

Like most of you, when I think about my dreams, I think of this picture.

I was eight years old when I saw Neil Armstrong land on the moon, stepping off the lunar module and stepping on the moon.

It was a sight I had never seen before, and I have never seen anything like it since.

There was one simple reason humans wanted to go to the moon: President Kennedy set a deadline and made it a public promise.

If there had been no deadline, I would still be dreaming of landing on the moon.

According to composer Leonard Bernstein, great achievement requires two things: planning and insufficient time.

(Laughter) The lessons of the Apollo program, deadlines and commitments, are great but fading.

That's what gave meaning to the term "moon rocket launch."

And what the world wants is political leaders who, on the same scale as the Apollo program, set themselves bold deadlines for achieving their ambitious dreams.

When I think of my dreams, I think of the drag queens who fought in LA and the Stonewall rebellion, and the millions of people who came out at a dangerous time when everything was at risk, and the rainbow-lit White House in this photo.

A picture I never dreamed of. When I was 18, I started to realize that I was gay, and that's why I felt alienated from my country and my dreams.

When you look at this family photo, I never dreamed I'd have a family.

We need more of the same courage that drag queens and astronauts have.

(Laughter) (Applause) But what I want to talk about is that beyond one aspect, it's about the need for us to have dreams, because there's something about the Apollo program that I didn't know when I was eight years old, and there's something about that rainbow, too.

Of the 30 astronauts involved in the Mercury, Gemini, and Apollo programs, only seven were married.

The image of the legendary astronaut bouncing on the moon has obscured the presence of alcoholism and depression on Earth.

The Trappist monk Thomas Merton asked during the Apollo program, "If we can't cross the chasm that divides us from our selves, what do we get from flying to the moon?"

And what do we get with the right to marry if we can't overcome the harshness and emotional divide that so often separates us from love?

It's not just about marriage

I've seen heartbreaking, devastating and tragic infighting in the name of love among LGBT, AIDS, breast cancer, and non-profit organizations.

Thomas Merton also wrote of the struggles between saints: "Modern violence is prevalent in certain forms in which the idealist succumbs so easily: activism and overwork.

Our activist frenzy cripples the movement for peace.

It destroys your inner capacity for peace.”

Often our dreams become this fragmented obsession with a certain future that destroys the power that exists to live in the present.

The dream that people in the future and others living in foreign lands will have a better life is what keeps us away from the beautiful people we live with today.

You could say it's the price of progress.

Either go to the moon or maintain a stable home.

Neither can dream on both fronts at the same time.

When it comes to the emotional side of life, you don't set a bar higher than stability.

So while our ability to communicate with each other accelerates rapidly, our ability to hear and understand each other remains unchanged.

Access to information accelerates through the roof, but the means to pleasure remains grounded.

But the idea that the present and the future are mutually exclusive, that we have to give up our deepest potential as human beings in order to realize our potential through action, that the number of transistors in our circuits keeps doubling, and that our capacity for compassion, humanity, peace, and love is at most limited, is false and leads to suffocating choices.

We're not making boring suggestions for more work-life balance.

When you're at home with your kids, what good is it if your mind isn't here?

It's not about mindfulness

Mindfulness suddenly became a productivity tool,

(laughs) Right?

I'm talking about dreaming as boldly about our existence as we dream about industry and technology.

It's about being able to shed tears for one another on the basis of audacity of trust, about taking off the mask and being who you are, on the basis of brave humility.

It's our inability to be with each other in the first place, our fear of weeping for each other, that has created problems that we are desperately trying to solve, such as parliamentary stalemate and the dehumanizing side of the economy.

(Applause) The medical scientist Jonas Salk called it "Epoch B," and he said, "In the new era, we will be as excited and concerned and scientific about the development of humanity as we are about the development of technology."

We shouldn't shy away from this opportunity simply because we don't understand it.

There was a time when humans didn't understand the universe.

It's not a matter of technology or being accustomed to activism.

It's the very definition of being stuck in your comfort zone.

We are content with imagining unimaginable technological achievements.

It's 2016, and we're being asked to fully imagine aspects of our very existence.

We're here to dream, but let's be honest, each of us is chasing our own dreams.

We're looking at each other's nametags to see who can help us achieve our dreams.

"Don't talk to me, I'm thinking of saving the world"

don't you

(Laughter) A long time ago, I ran a wonderful company that did the long trips you see here at large public events.

The company motto was, "Aim for both humanity and compassion."

And I recommended a very kind experiment.

For example, "Help everyone put up their tents."

A lot of tents were built there.

(laughs) "Buy everyone ice cream."

"Fix the flat tire even if you know it's going to be late for dinner."

Now that everyone is doing this, there are a lot of people out there who have a flat tire on their "AIDS ride" and ask if they need help.

In a matter of days, we created the world that everyone wanted the world to be like for tens of thousands of people.

What if we create a similar world in the next few days?

Instead of asking, "What do you do?" ask:

"What is your dream?"

"What is your unfulfilled dream?"

"TED" is also an abbreviation for "helping people dream"

(Applause) Maybe your dream is, "I want to be sober," or "I want to build a treehouse with my kids."

Instead of going to talk to someone who everyone wants to meet, go to someone who's alone and ask them out for a cup of coffee.

What we fear most is that we may die without being denied the opportunity to realize our true potential, our innate ability to dream.

Picture yourself living in a world where you have deep existential fears for one another, yet boldly love each other, because you know that it's human nature to live with those fears.

It's time to dream on many fronts at the same time. There are so many wonderful things that we can, will be able to, and must do, but beyond that lies the incredible things that we might be able to achieve.

It's time to step into that realm, and it's time to reveal the fact that the dream is there.

If the moon could dream, the moon's dreams would be dreams for us

I am honored to be here

thank you

(applause)

The space that once took a single transistor can now hold a billion transistors.

Big computers that once took up an entire room are now pocket-sized.

You might say that progress is miniaturization.

As an engineer, I was inspired by the computer miniaturization revolution.

As a doctor, I hope to use it to save as many lives as possible from one of the fastest growing diseases: cancer.

When I say that, most people think we're doing cancer treatment research.

although it is true

In fact, we've seen an incredible opportunity to save lives through early detection and prevention of cancer.

More than two-thirds of cancer deaths worldwide are completely preventable with current methods.

Vaccines, early detection through cancer screening and, of course, quitting smoking.

But even with the best technology and methods, some cancers continue to slip through the screens, and during that time, the cancer cells multiply until 10 years later, when they're 50 million, they're only found.

What if we had a technology that could detect these dangerous cancers early in their embryonic stages when they could be eliminated?

Let me tell you how the miniaturization of devices contributes to this.

It's an ordinary laboratory microscope that pathologists use to view cell samples in biopsies and cervical cancer screenings.

With this $7,000 microscope, experts with years of specialized training look for cancer cells.

This is from a document by my colleague at Rice University, Rebecca Richards-Coltom.

She and her team miniaturized the microscope to $10 a piece so it could be attached to the tip of a fiberscope.

Now, instead of taking a sample of cells from a patient and examining them under a microscope, we can send the microscope into the patient's body.

Then, instead of being read by an imaging specialist, we train a computer to record normal and cancerous cells.

The reason this is so important is because this is what's happening in rural Brazil, where more than half of the women who travel around the country in a car equipped with a cervical cancer screening machine, take tissue, send it to a central hospital for analysis, and then, a few days later, receive a notification of an abnormal cytology and are asked to come to the hospital.

I don't go to the hospital because I don't have travel expenses.

But with an operating microscope and computer analysis equipment, Rebecca and her colleagues built a diagnostic and therapeutic vehicle that could diagnose and treat at the same time.

Now, diagnosis and treatment can be done on the spot while traveling, and no one is left out of treatment.

This is just one example of how miniaturization can save lives.

For us engineers, this is a simple example of miniaturization.

Because we made big things small

So when computers became so small that they could be carried anywhere, they changed the way we live.

What does this transformation translate into for healthcare?

What if there was a diagnostic device that was tiny and could circulate freely through the human body, find tumors on its own, and send signals out of the body?

It's like a sci-fi story

Nanotechnology makes exactly this possible.

Nanotechnology can shrink the components of a diagnostic device from 100 microns, the size of a human hair, to 100 nanometers, a thousand times smaller.

this means a lot

When matter reaches nanoscale dimensions, its properties change.

Everyday substances, like gold, when you grind it into nanoparticles, it turns from gold to red.

Some of the more unusual materials, like cadmium selenide -- they're big black crystals -- can be turned into nanocrystals, put in a liquid, and when you shine a light on them, they'll glow.

It glows in various colors depending on the size of the particles, such as blue, green, yellow, orange, and red.

Such an amazing substance outside the microscopic world is impossible, isn't it?

The jeans in your closet are all made of 100% cotton, but they all have different colors depending on their size.

(Laughter) As a doctor, I find it equally interesting to see that when you get to the nanoscale, it's not just the color of matter that changes, but the way it moves through the human body.

We're going to use this property to build better cancer diagnostic tools.

let me show you what

this is a blood vessel in the human body

Surrounding it is the tumor

Let's inject nanoparticles into this blood vessel and see how they move from the bloodstream to the tumor.

Many tumors have blood vessels full of holes, so particles can leak through the blood vessels into the tumor.

depends on the particle size

Here, the smaller 100-nanometer blue nanoparticles are leaking out, and the larger 500-nanometer red nanoparticles are lodged in the bloodstream.

So, as an engineer, you can control where in the body the materials you make are, whether they're big or small.

In my lab, we recently built a nano-sized cancer diagnostic device that's really small enough to hunt for tumors in the body.

Designed to detect tumor invasion, it listens for chemical signals that tumors need to grow.

To grow out of the tissue where the tumor originates, it must make chemicals called enzymes to erode the tissue wall.

So we created nanoparticles that are activated by this enzyme.

A single enzyme can trigger these chemical reactions a thousand times in an hour.

This is what engineering calls the "1:1000 ratio," and it represents the amplification of activation, and that's what makes it supersensitive.

Using this method, we have created an ultra-sensitive cancer diagnostic device.

So how do we get this activated signal out of the body and use it therapeutically?

And this involves another aspect of nanoscale biology, which is related to the kidney.

Kidneys act as filters

filters the blood and flushes waste products into the urine

Now, what the kidneys filter also depends on their size.

Thus, all particles smaller than 5 nanometers in size flow through the bloodstream to the kidneys and are excreted in the urine, while all larger particles remain in the body.

If you make a cancer diagnostic device that's 100 nanometers in size, and you inject it into your bloodstream, it leaks out of your blood vessels, flows into your tumor, is activated by tumor enzymes, and emits a tiny signal that's so small that it's filtered by your kidneys and excreted in your urine, and the signal that appears in your urine can detect cancer.

one more problem remains

How do we detect this very small signal?

This signal is just a particle

made by our engineers

It's completely artificial, so we can design it to fit the devices we want to use.

If you want to use a mass spectrometer, which is a very sensitive, high performance instrument, you create particles with specific masses to match their accuracy.

If you want to make something cheap and portable,

We create particles that can be embedded in paper, like pregnancy test kits.

In fact, in the field of paper-based diagnostics, paper-based diagnostic devices are now being used for all diagnostics.

So what are we trying to do with this?

What I'm about to tell you is what I've been dreaming about throughout my career as a researcher.

This is not a promise, it's a dream.

But without a dream, no one can push forward, and perhaps that's especially true of cancer researchers.

I'm going to put my heart and soul into it with my teammates to talk about what we want to achieve with this technology.

This is it

I dream of the day when, instead of going to an expensive diagnostic facility and getting a colonoscopy or a mammogram or a cervical cancer screening, I'll get an injection, wait an hour, use paper test strips, and do a urine test.

This way, the lab won't always need electricity or medical personnel.

Healthcare workers may be able to make diagnoses remotely from smartphone images.

This may sound like a dream, but in the lab, it's already been demonstrated in mice, and it's been more successful in diagnosing lung, colon, and ovarian cancers than traditional methods.

My hope is that one day, we'll be able to use this to detect patients' tumors early -- instead of waiting 10 years for them to grow back -- so that early detection, early treatment, and the ability to save the lives of more patients than ever before can be achieved in any situation around the world.

thank you

(applause)

do i look real?

I hope so

I don't know if you're looking, but I'm just going to look ahead and believe you're there

I drew a semicircle in the sand in front of me and stepped over it so it wouldn't be seen floating in the air.

Now I'm outside, standing in the shade of a palm tree on the beach, where the stage used to be.

The time given is 12 minutes

set a limit

My wife Naveed once said that infinite possibilities are the creator's greatest enemy.

For example, this dress, I asked her to design something similar to what a priest would wear in Cairo in the 23rd century.

But it only took three days to make it, and the only cloth I had was a quilt cover that had been left behind by a previous resident.

but she did it and perfectly

When she saw the finished dress, she said, "Creation must be limited—it's a proof of concept."

Now, in the next 12 minutes, I'd like to share with you my greatest discovery of all time.

All my life, I've been obsessed with eternal life, and I'm sure some of you are too.

You may be pleased that your quest so far has been rewarded.

i am 318 years old

The current human life expectancy is 432 years old, and my job was to extend human lifespan to infinity.

I was convinced that one day mankind would be satisfied with its own lifespan.

But it's the opposite: the longer you live, the more you want to live and the less you want to die.

Of course?

the universe is vast

There's more to see

Just yesterday, I sailed to Europa and read about how to sail from island to island around the planet. Some islands have villages where you can stay and sleep under the shadow of Jupiter.

On one island, there's just one composer playing his mandolin out to sea.

There are other places where no one has ever been before, where you can experience the joy of putting your feet in sand where no one has ever set foot.

You can spend 400 years just like that.

Just this month the moon rose from the northeast

A city on the moon can be seen with the naked eye

Cities are connected like nerves: Mariapolis in Antarctica and Ramachandran on the equator.

And in the sea of ​​tranquility, New Tehran

There Naveed and I met

They were both downtown artists.

The day we met, we bumped shoulders as we passed each other in Azadi Square.

When I turned around to apologize, she didn't say hello or introduce herself and said, "Hey, why do you think we didn't pass each other?"

At first I thought, "Who the hell are you?"

But the question quickly irritated me, because the answer was so simple.

I said, "The reason we couldn't pass each other is that elementary particles have mass, and the gaps between them are also filled with mass-bound binding energies, and we've known this for 800 years."

Was she probably in the mood to flirt with other people?

Maybe she wanted to seduce me because she looked at me and said, "I thought you would say that.

Think better."

And she took the belt -- this one I'm wearing now -- and she said, "Our universe is designed so that particles have mass.

Without that basic constraint, we wouldn't have known each other at the speed of light."

That's how our love began

Naveed and I never stopped talking.

never

it was great

Like two heroes climbing mountains, we reached new landscapes and felt like new and perfect constellations of words were spinning out of our mouths.

And he quickly forgot what he had created, threw it behind him, and went on to the next.

At one point, Naveed said that our conversation was like making bread, always adding a little flour and a little water, mixing it well, flipping it over, but never getting to the point where it was baked.

While I was obsessed with eternal life, Naveed was obsessed with touch.

she had talent

The center of her work has always been the sense of touch.

My body was like her canvas, and she used to caress my face so softly that I didn't even notice the movement of her fingers.

And she was fixated on the very moment I lost sight of the boundaries between our two bodies.

Or if she leans over my shoulder and says, "Pillar, why are you feeling so good?"

I was replying "Come on!"

She always had her own funny answers to the silly questions, and the answer I remember was, "It feels good, because the universe chooses its own constraints, and we are what the universe is - art."

The contrast between the imagined future and the actual future is always interesting.

In your time, scientists believed that humans could freeze themselves and be reanimated in the future.

I tried it, and it died shortly after.

In your time, scientists thought that humans could live hundreds of years longer by replacing their organs.

I tried it and ended up dead.

In your time, the earth is the only place inhabited by mankind.

In my time, Earth is the place where humans go to meet their deaths.

So when Naveed showed signs of dying, my friends figured I'd do what everyone else did: say goodbye and send her back to Earth so no one would ever see her or be by her side, thinking about her and how she couldn't continue to live.

I'll try not to think about it

Most of all, they didn't want to be near her physical body.

Everyone said the body was "decaying," though she herself was fascinated by the changes it was going through -- the changes that followed the nature of the body, regardless of her will.

i sent her to earth

I came with myself

I remember a friend saying before we left, "I feel so arrogant, it's like our love is special and we don't care about the rules."

but i came

So we continued to search for ways to extend life on this planet.

I didn't even think of what else to do

I always go back to what Naveed told me that day in Azadi Square, that if it weren't for the fundamental constraints -- if the universe hadn't given matter mass -- we wouldn't exist.

this is one rule

Another rule is that all matter is based on entropy.

We cannot exist in this universe without mass.

yeah i tried it all

I also tried to make a photon box that changes the Higgs field.

I even recorded all the atomic motions that were happening inside my body and tried to recreate them in a closed circuit.

it didn't work

But in my last invention, I built coils that fit the boundaries of the body, where time flows incredibly slowly, but the projected images follow the normal flow of time.

And then your body appears as a hologram in this universe, it doesn't seem to be here.

When I finally realized I had done it, I rushed to her room, and I was so happy to share my findings.

I have found a way to achieve eternal life at the expense of what Naveed loved most: touch and being touched.

she left me

i still have to wait

Humans now live 400 years, but they'll still die someday.

And when death comes, it pulls the sheets of the bed with its arms and makes blue and purple flowers bloom in the body, and people's breath goes farther and farther away, as if they were falling asleep.

I always think that adventure gives meaning to life.

Death is just a problem that we haven't found a solution to yet.

But maybe life has meaning because it has an end.

This may be a contradiction, because constraints are not constraints, they are perfect freedoms.

(sighs) It thundered here this morning.

The forecast for tonight seems to be different, but for now the sky is clear.

I can't feel the wind, so I asked one of the passing caretakers how it felt, and he said it was as warm as melted butter.

a fitting answer for my wife

I have to find a way to get back to my flesh

Until then, I want to stay in this place that you gave me.

I'm Richard Balanik, and I want to share with you today some ideas that resonate with everything that's been said over the last two days.

In fact, they are related in many different ways. It's hard to say them all, but I'll do my best. Do you remember what this is?

(Laughter) Yes, LP records. They've been replaced by something else.

We've been pushed out by the digital technology that has overwhelmed the world for the last two decades, right?

A good example is that when we walked into this room today, Thomas was "playing" music.

The world of music has created a kind of culture, or ecosystem, as Apple puts it in their advertising copy: Rip, Mix, Burn.

It means that anyone in the world can freely create new music and musical ideas.

It means that existing musical ideas can be taken and copied and reused in innovative ways by people all over the world.

You can mix scraps of musical ideas in various ways, connect them, and create a new work (CD).

That's how we create a vibrant community where people combine their musical ideas to create new works.

Today's hits are different from last year's

But I'm not here to talk about music today.

I'm here to talk about books.

Especially about the textbooks and materials that we use every day in school.

Have any of you ever been to school?

(Laughter) Do you know that schools are in crisis? In the world

I'm not going to spend a lot of time on that part, but what I really want to talk about is some of the disconnects that authors do in publishing their books.

In fact, the publishing process is so complex that the book has to be heavy and expensive, creating a kind of barrier between the author and the user of the book (teacher, student, general reader).

If you don't understand the world's major languages, especially English, the problem is even more acute.

I call them the "exclusion barrier people," because they're completely shut out of the process of sharing their knowledge with the world.

And that's exactly what I want to talk to you about today. I've touched on what's happening in the world of music culture, and similar ideas can change the way we write and use and teach books.

Now let's talk about how we actually do this.

First, let's do a simple thought experiment.

Now all the books in the world

Picture what you're holding in your hand, then tear those pages out of the book.

And then we digitize the freed pages into a huge data vault that is connected all over the world.

Imagine a Massive "iTunes" for Book Content

And then we put it all out there, and everyone was free to modify it and improve it for free.

Imagine information technology enabling people all over the world to access, update, improve, and use this knowledge in their own way, and in seconds what would have taken years of work to do.

Imagine a book that has been reprinted every two years and is updated every 25 seconds.

Imagine being able to mobilize the power of people to do that.

We can create an ecosystem that includes not just the authors of books, but all the potential authors, and that's in all the languages ​​of the world. What would you call such a system? For now, let's call it a knowledge ecosystem.

It's a dream come true, and the best analogy for what we're trying to do is that anyone, anywhere in the world, can become an educational DJ.

In fact, this dream is becoming a reality.

Over the past six and a half years, we've been working hard at Rice University on a project called "Connections." For the rest of our time, I'm going to talk about what's going on through Connections. You can contrast this with what Nicolas Negroponte was talking about yesterday.

A commitment to open source tools and educational content

keep that in mind

So what kind of people are using these tools?

First, there's a community of engineering professors from Cambridge to Kyoto who are developing teaching materials for electronics.

Designed for each university to customize and use for their own purposes

And Kitty Jones, a music tutor and mother from Champaign, Illinois, wanted to bring her unique materials to the world to teach children how to play music. Now, her materials are used more than 600,000 times a month.

That's a lot of usage

In fact, it's often used in kindergartens, elementary schools, middle schools, and high schools in the United States, because music education is the first to be affected by school budget cuts.

That's why the demand for free, freely available materials like this is so great.

Many teachers are using this system. Ripping of teaching materials

What about replication reuse?

At the University of Texas at El Paso, a group of graduate student volunteers are translating the contents of the super electronics textbook I mentioned earlier.

Within a week, it should be popular and widely used throughout Latin America, especially Mexico, because the nature of this material is open extensibility.

Volunteers and even companies are participating in this effort to translate these materials into Chinese, Japanese, Thai, and other Asian languages, and to spread the knowledge even more widely.

So what about Mixing?

Mixing is creating a curriculum that meets individual needs

And that means creating a textbook for each purpose.

Companies such as National Instruments are developing online textbooks that embed powerful interactive simulations to create interactive learning experiences that are not possible with standard textbooks.

Teachers Without Borders is very interested in mixing and using our materials, using our Connections system as a platform.

We are planning to develop teaching materials to teach teachers how to teach and distribute them to 84 countries around the world.

They're currently training 20,000 teachers in Iraq with the support of the United States Agency for International Development.

For them, the idea of ​​being able to tailor materials to local needs is very important, because it's a form of cultural imperialism to say that people in developing countries would be happy with anything if they could get it for free.

There are other organizations that we work with, and you know the University of California, Merced.

It's a new university in California's Central Valley that works closely with community colleges.

They're actually developing a science and engineering curriculum, and they're going to publish it to the world through our system.

In addition, we develop all of our software tools completely open source.

Another company, AMD, is working to bring Internet access to 50 percent of the world's population by 2015 through a project called "50 by 15."

We are cooperating in this endeavor by providing existing teaching materials in multiple languages.

We work with many other organizations

In particular, many projects funded by the Hewlett Foundation have taken leadership roles in the open content arena.

Next is "Burn" and this is where it gets really interesting.

So what I mean by that is the act of materializing this kind of curriculum, which I'm sure many of you have already received.

I think there was one music book like this in your gift pack.

it's a small gift

I'll be very brief, let's take this engineering textbook as an example.

It's a thick 300-page book.

can anyone guess the price?

How much will it sell for in bookstores?

(audience): $65 (about 6,000 yen)

Students can buy it for $22 (about 2,000 yen)

How does it cost $22 (about 2,000 yen)?

Because it's published on demand, and it's built using this repository of public materials.

If this book were published through a commercial publisher, it would cost at least $122.

What we're talking about is transforming this process of publishing, called "Burning," from a generic single-author process to a low-cost, on-demand publication of community-authored material that's tailored to the needs of each class, whether it's sold through Amazon or through an on-demand service like Co-op.

I think this is an incredibly interesting area, because there's something really cool about the long tail of publishing.

Rather than belonging to the left side of the long tail like Harry Potter

I'm talking about books like hypergeometric partial differential equations.

Yes, it's a publication that sells only 100 to 1,000 copies a year.

This amazingly sustainable revenue stream from the "long tail" is not only helping to sustain open projects like ours, but it's also helping to support emerging on-demand publications like the Coop business that published these two books.

A very important part of this story is the omission of the middleman, and the demiddleman movement has become even more popular.

It's going to be a big trend in the publishing industry in a few years, and it's going to be more profitable for us and the world.

So what is it that makes this trend possible?

Who are the real driving forces behind this transformation?

With so much technology out there, the only thing I really want to talk about is XML.

How many of you are familiar with XML?

Wonderful XML is the technology behind the future of the web.

XML is a semantic representation of comments and content.

The meaning of XML in this case can be thought of as a package that holds these pages together.

Remember when you pulled out the book and ripped the pages out?

So the job of XML is basically to replace these pages with Lego bricks.

XML is at the heart of the Lego-like ability to reassemble content in a myriad of ways, and it also provides a "framework" for sharing content.

XML allows you to create highly sophisticated learning devices out of these educational content and this system in its pristine state, littered with pages of ripped-out books.

This technology, called XML, allows us to tailor each student's learning experience to their needs, so that each student can have textbooks and coursework that match their individual learning style, learning environment, language and interests.

With XML, we can reuse the same material in different and novel ways.

In addition, XML allows us to display the relationships between different domains, which helps us in the process of connecting diverse ideas.

On a personal note, we came up with this idea because

About six-and-a-half years ago, I was teaching you what's circled in red (the equation).

As Chris said, I'm an electronics professor.

For example, the hardest thing about teaching signal processing is this equation... wow, half of us fell asleep just by looking at this equation.

(Laughter) But it's this seemingly trivial formula that connects technology and applications like musical synthesizers to enormous economic opportunities for great economic success, and it's the centerpiece of a very powerful web, and something that's governed by intellectual property rights.

And what I realized was, as an engineer, I could never have written such a comprehensive book by myself.

It's only possible because of the community, and we also needed new tools to connect ideas.

In a way, what we're working on is Professor Minsky's dream come true. You can imagine the different books in the library starting a conversation with each other.

If you're a teacher or have taught, you know what I mean: the essence of teaching is the interconnection of ideas.

Coming back to the math, imagine it's possible to do something like this:

Suppose you can click on every single equation in your e-textbook to explore, experiment, and learn more about it.

For example, in an algebra textbook for an eighth grade child,

You can just click on each of the equations and you'll get a simple tool that allows you to experiment and play around with the equations to get a better understanding of the equations.

Because you can't really understand unless you actually do it.

Using a chemistry markup language similar to MathML

You can create textbooks that allow you to understand molecular structures as if you were holding them in your hand.

The application of XML to the field of music allows us to explore the semantic structure of music and create textbooks that can be experienced and understood.

No wonder everyone wants to jump (to XML)

Even the Three Wise Men of the East are like that.

(Laughter) Now about the second most important agent of change, intellectual property.

I actually lied

I just told you from this podium how amazing the changes that are happening in the world of music are, sharing music.

It's illegal to take it apart and remix it (for example, on a CD).

You can be accused of being a copyright infringer (for illegal copying), because you own the original song.

And most of it is owned by big industry.

I mean, something like this isn't really possible.

We can't afford to do what Napster did.

So to go back to the origin and solve this problem

The challenge is to find a framework for intellectual property that allows for sharing and that is easily understood.

Breakthroughs like Linux and GPL

open source software and

It's under a Creative Commons license

Ever heard of Creative Commons?

If you don't know, learn first at Creativecommons.org

At the end of all materials shared on Connections and many other projects,

It's got this logo, and just by clicking on it, you're directed to a statement that anyone can understand what you're allowed to do with the published content.

In fact, you are allowed (under this license) to freely share, copy, modify, and even use it commercially, as long as the author (of the original work) is credited.

Because the purpose of scholarly publishing, and most educational publishing, is to have a social impact by sharing knowledge.

it's not for making money

We're not talking about "Harry Potter" here.

It's the book at the end of the long tail.

It's legally regulated, so if you use it carefully

Creative Commons works great. Over 43 million works are licensed under Creative Commons.

This includes not only text but also works such as music, images and videos.

In fact, a growing number of people are embracing the idea of ​​"resampling," that is, releasing music under this license so that anyone can "capture it, mix it, create it, share it."

Finally, I would like to conclude with a few key points.

The "commons" idea that we created is already being used by people.

Our site alone receives more than 500,000 visitors each month.

Another big open content site, MIT OpenCourseware, has a similar number of visits.

How can I keep it connected to the future?

The first is quality control.

After all, no matter who contributes anything to this commons

I don't care

that (quality control) can be a problem

It didn't take long, for example, to start posting posts about underwear, and it was actually a pretty good module, but...

The only problem was that the content was plagiarized from a major French feminist magazine, and when I tried to go to the lecture website, it led me to a website that sold underwear.

This is a bit of a problem

So clearly we need some kind of quality control mindset, and this is exactly where we need the validation and peer review mindset.

Why did you come to TED?

That's because Chris and his team have continued to ensure the high quality of this event.

We have a mechanism that enables us to do the same.

So we're building social software to enable everyone to have their own peer review process. We call these mechanisms "lenses."

The software allows anyone to set up their own peer review process and focus only on the content of the repository that they believe is really important.

TED can also be seen as this lens.

And finally, these changes can be viewed as "triggers to action."

At the heart of Connections and Open Content is knowledge sharing.

All of you here are filled with an enormous amount of knowledge, and I would encourage each and every one of you to get involved and contribute to our project and others like it.

thank you for listening

"The Value of Nothing: Something is born out of nothing"

This was an essay I wrote when I was 11 years old. And the evaluation was B+. (Laughter) I'm going to talk about something out of nothing and how we create.

Moreover, we would like to proceed with this talk within the 18 minutes that we have been given, and according to the rules of TED. In other words, it actually creates a near-death experience, but asphyxia works well for creativity.

(laughter) Okay.

Yes, I would also like to explain this. Dave Eggers told me that if I lied about universal creativity or said something that wasn't true, he would start questioning me.

But I'm talking this way. Half of you are scientists.

When I say "we", I don't necessarily mean you. I am referring to myself, my left and right brains, and the inspector inside of me who points out that what I am saying is wrong.

And as I go along, I'll look at what I think is part of the process of creating. It contains a number of past events. In fact, the nothingness began before the moment I was creating something new.

And that includes genetics, upbringing, and what I would call a nightmare.

Now, in the area of ​​genetics, we look at whether we are born with something. Perhaps it's like a chromosomal abnormality in the brain that has an artistically inspiring effect.

Some say we are born with something by other means,

Some people, like my mother, say they got something from their previous lives.

Some say that creativity may be the function of some kind of twisted nerve. Van Gogh Syndrome – as you may know, a bit of psychosis and depression.

However, someone... recently read that Van Gogh wasn't necessarily mentally ill, but had seizures of temporal lobe epilepsy, which may have allowed his creativity to overflow. I also think that temporal lobe epilepsy works in some part of the brain.

I say that because I myself had a seizure of temporal lobe epilepsy a long time ago. Around this time, I was in the process of writing my latest book, and I've been getting comments that it's very different from the others.

I think part of the creativity also comes from a sense of ego crisis. Who am I, why am I who I am, why am I not black like everyone else?

Occasionally, some people have outstanding abilities, but they may not be conducive to creativity.

I used to draw and thought I would become a painter.

I used to have a miniature poodle.

It wasn't bad, but it wasn't very creative.

All I could do was present things in a strictly one-to-one fashion.

In retrospect, I think this was probably a copy from a book.

I didn't really stand out in the field I wanted to be. And as you can see, the score wasn't bad. However, I never expected that I would be able to make a living by making a clever list of words.

Also, one of the laws of creativity is childhood trauma.

I too have a common type of trauma that many people have. That, as you can see, is the expectations of those around you.

By the way, this doll, this doll was given to me when I was only 9 years old, to help me become a doctor from a very young age.

Some traumas last longer. Between the ages of 5 and 15, this photography was supposed to be my side job. But what was left behind was the feeling that I had failed.

But there are actually very vivid things in my life. That was when I was about 14 years old.

Brain tumors were found in my brother in 1967 and in my father six months later.

My mother believed something was wrong and tried to find out what it was. And I tried to restore it.

My father was a Baptist minister and believed in miracles. And with God's will everything will be fine.

But of course, they both ended up dead six months later.

My mother then came to believe it was fate or a curse. My mother searched all over the universe in search of the reason why they died.

Anything other than coincidence. My mother didn't believe in coincidence.

There is a reason for everything.

And my mother thought that one of the reasons was that her mother, who had died when she was very young, was angry with her.

So I always felt close to the concept of death. Because my mother believed that I would be next, and then herself.

And when you're confronted with the concept of death so early, you start thinking deeply and deeply about all things.

Be creative in the sense of survival.

And this led me to my big question.

That question is the same one I have today.

Why do things happen and how do they happen?

And the question my mother had - how do I make things happen?

It's a great way to think about this question when writing a story.

In the first place, you have to answer why and how things happen and in what order they happen within the framework of pages 1 to 300. how does it affect?

As a narrator, as a writer, how do I influence?

And I think that's a question that many scientists have had.

It's like cosmology. And I, as the creator of my universe, must create a cosmology of my universe.

As you can see, over the years, there's been a lot of repeated trial and error trying to make something happen, trying to figure it out.

When I look at creativity, I think this feeling, or this sense of helplessness, inhibits us from looking at the relevance of virtually everything in life.

I felt a lot of that feeling during this conference. Probably for almost all events.

Let's use this association as a metaphor. quantum mechanics. I have no idea myself, but I will use this to explain how this becomes a metaphor.

In quantum mechanics, of course, there is dark energy and dark matter.

This is the same as considering the question of how things happen.

There are many unknowns. But often we don't know anything other than that we don't know it.

But when you associate it like this, it comes together with some kind of synergy in the story, and what you find is what's important. That's what it means.

And that's what I look for in my work: personal meaning.

In quantum mechanics, there is also the uncertainty principle. As far as I know. (Laughter) And this happens a lot in writing.

And then there's the dreaded observer effect. When you're looking for something, you see, there are many things happening at the same time, and you're looking at them from different perspectives. And they try really hard to find out what it's all about, what the story is about. And when you try too hard, you can only write about most things.

can't find anything.

And what you should have found, what you hoped to find by chance, is no longer there.

Now, I don't want to ignore the other side of what is happening in our universe, as many scientists have done.

So I'm going to add a bit of "string theory" here, just to say that creative people are multifaceted, and that there are, I think, 11 levels of anxiety.

(audience laughter) And all those levels work at the same time.

There is also the big question of ambiguity.

And then we will link it to something called the cosmological constant.

I don't know what's working, but something is.

And for me, ambiguity is a very unpleasant thing in life. Ethical ambiguity.

It is always there. This is just an example, but there is an ambiguity I experienced recently.

It was an editorial written by a woman about the Iraq War. She said, "Save the drowning man. You owe him your life."

This is a very famous Chinese proverb.

In other words, you went to Iraq, so you should stay there until everything settles down. Even for maybe 100 years.

Then I happened to find another phrase. It's "saving fish from drowning".

This comes from the words of Buddhist fishermen who were not allowed to kill living things.

But they have to live and people have to eat.

So their rationale was that they were trying to keep the fish from drowning, and unfortunately the fish would die in the process.

So, what do these two metaphors about drowning mean?-Actually, one is my mother's interpretation of the famous Chinese saying, "Save the drowning man, you owe him your life."

And this is a warning...don't get involved in other people's affairs. Otherwise you'll end up dead end there.

If someone was really drowning, I think my mother would have gone to the rescue.

But it seems to me that these two phrases, that is, to keep the fish from drowning, and to save the drowning, were related to intention.

When we observe a situation in life, we react.

From there, it becomes intentional.

Here comes the ambiguity of what we should and should do. Here we do something.

The results may not match our intentions.

Maybe I'm wrong. What then is our responsibility?

what should we do?

Do you just stay there for life, or do you do something else to justify it and say, "But the intention was good, so I can't take all the blame"?

This is the ambiguity in my life. This made me so uncomfortable that I later wrote a book called Saving Drowning Fish.

I've seen many examples of this since the question was clarified. It's in there.

The impetus was everywhere.

And in a way, you could say that I knew it was always everywhere.

And write, this is what happens. With these hints and keys, we know that the question was clear, but not yet clear.

And really, you need focus.

When you have a question, it's the focus.

Everything that seems silly in life actually goes through the question. What happens then becomes related to such concrete things.

This seems to be happening constantly.

I'm sure you all think that there is some kind of coincidence or a stroke of good fortune through which you get all the help from the Universe.

It could also be explained by the focus you have now.

And we are noticing it more often than before.

But it fits.

You begin to see how things relate to the contradictions within you.

Will you take care of your troubled brother or not?

Why or why not?

Maybe it's something more serious that you're thinking about. As I said earlier, about human rights in Myanmar.

Someone told me that if I went, I would recognize Myanmar's military government, so I thought I shouldn't go there.

But after a while, I had to ask myself, "Why would I take responsibility for someone else's knowledge and predictions?"

It's the same feeling I had when I was little, when my father, a Baptist pastor, told me the rules of moral conduct.

So, I decided to go to Myanmar with my own intention. But I still didn't know what would happen if I went there, what would happen if I wrote a book. I just thought I would have to face it when the time came.

We care about what we see in the world of our awareness.

Having reached this point, what do I do as an individual? I ask.

Not everyone can go to Africa or work in a hospital. So what do you do when you have this moral reaction, this feeling?

Moreover, I think one of the biggest problems that we are all seeing that we are talking about today is genocide.

This leads us to the next question.

When I look at all that is morally ambiguous and offensive, and when I think about what my intentions should be, I find that it goes back to the question of self-consciousness I had as a child. Why am I here, what is the meaning of my life, and what is my role in the universe?

It seems very clear, and it is not yet clear.

In some ways we loathe moral ambiguity, but it is also absolutely necessary.

That's my starting point when I write stories.

Apparently, I get some help from space every now and then.

My mother said from my first writings that it was my grandmother's spirit. It was because I knew something I shouldn't have known.

Instead of writing that my grandmother died in an accident because she overdosed on opium, I wrote the story that the woman committed suicide. And that is what actually happened.

My mother decided that the information must have come from my grandmother.

There is also something mystical that gives us useful information when we are writing.

About this, I was writing a story, which included certain details, certain periods of history, specific places,

And I was looking for something historical that would fit right in.

I picked up a book and... the first page I turned was exactly the setting, the period, and the character I needed was the Taiping Army, which took place in an area outside Guilin, near Guilin, a man who thought he was a child of God.

Do these things happen by chance? you think.

So what is coincidence? What is luck? What is luck?

What is the unexplainable thing we get from the universe?

And that is also part of the story.

These are the things I keep thinking about day after day.

Especially when good things happen and when bad things happen.

However, I sincerely think that there is something like an unexpected coincidence, and I would like to know from the bottom of my heart what the element is. To appreciate them and try to find them in life.

Because, again, it happens more often when I am conscious of it.

Another chance encounter was when I went to a certain place. I happened to be driving to different places with some friends. And I ended up in a place that was not a tourist spot. It was a beautiful village, a rustic place.

From there we walked over three valleys, and in the third valley I felt something very mysterious and ominous. At that time, I felt that it would be the background of my book.

And when I was writing a scene, it happened in that third valley.

For some reason I was writing about a stone mound made by a certain man, a pile of rocks.

I'm not quite sure why I was writing it, but it was very clear.

I got stuck and a friend invited me to come walk the dog and I said yes. After about 45 minutes, while walking along the beach, I came across this scene.

It was a man, a Chinese man, stacking stones without glue or anything.

I asked the man how could he do such a thing? I asked.

He said, well, I think there's a good balance in everything in this world.

That was exactly what my story meant at that point.

There are many such examples. When I'm writing a story, I come across many coincidences like this. And I can't explain it.

Because I can relate these examples more strongly to my writing activities, are they so relevant to my question?

Or is it an unexplainable coincidence, like the cosmological constant?

One of the big things I think about is accidents.

As I said, my mother didn't believe in coincidence.

What is the nature of the accident?

And how do we determine responsibility and cause without the courts?

I realized this when I visited a beautiful Dong village in Guizhou, the poorest province in China.

Seeing that beautiful place made me want to come back.

And when National Geographic magazine asked me to write whatever I wanted about China, I got the chance to get back there.

I agreed and said I wanted to write about singing people, singing minority villages.

They agreed, but between the time I saw it last time and my second visit, there was a terrible accident there. An elderly man fell asleep and his comforter fell into the fire that was meant to keep him warm. .

60 houses were destroyed and 40 were damaged.

The whole family will be responsible for

The man's sons were banished to live in a cowshed three kilometers away.

Of course, Westerners say, "It was just an accident, so it's unfair.

Not my father, but my son. will say.

When I write stories, I have to free myself from those beliefs.

It takes time, but you have to let it go and stay there.

That's why I visited there three times in different seasons.

And I started to get a different sense of the history of the place, what happened before, what the nature of life was like in a very poor village, what I found in amusements, rituals, traditions, connections with other families. And I saw how it has a kind of justice in its responsibility for the case.

I was also able to discover the ceremonies they perform. It is a ceremony that has not been held for 29 years. It consisted of sending several men...a master of Feng Shui to send them to the underworld on horse spirits.

Many of you Westerners, myself included, would think that such things are superstitions. But when you stay there for a while and witness incredible things happen, you start to wonder who owns the beliefs that run in the world that determine how things happen.

So I stayed with them for a while, getting into those beliefs as I wrote the story. I think it's important. Because that's where the story is true, and where I answer how I feel about some of the questions I have about life.

Of course, years go by and stories, as I'm trying to tell you here at TED, don't happen instantly.

Stories come and go. Once it reaches you, it will no longer be my book.

Once in the hands of the reader, interpretation is up to each person.

But how do you create something out of nothing? I'm going back to the question.

And how do you create your life?

And I think the way to create life is to keep questioning, to tell yourself that there are no absolute truths.

I trust the details. The details of the story, the past, the details of that past, and what's going on in the story at that point.

And I believe that my consideration of things, luck, fate, chance, accident, divine will, and the union of mystical forces leads to some idea of ​​what it is and how we create.

I have to think about my role. Where am I in the universe, did someone intend me to be who I am, or did I come up with it?

I think you can find it by imagining to your heart's content and becoming what you imagined. But it exists in the real world, the fictional world.

That's how I find the molecule of truth, not the absolute or total truth.

And it has to be in all possibilities, including ones I never thought of.

So there is no perfect answer.

Rather, if there is one answer, it is to convince myself that there is uncertainty in everything. And that it is a good thing. Because I discover something new.

And if there is a half-baked answer, a more complete answer that comes from myself, then it is simply a matter of imagination.

And to imagine is to put yourself in the story. Nothing there...until there's nothing between you and the story you're creating.

That's how I've found that I can sense what's in a story, a story. And that's where I think we come closest to knowing what empathy is and what it's like to feel empathy.

Because the question of how things happen in everything has to do with emotions.

To deeply understand empathy, I have to become a story myself.

Now that this talk is coming to an end, let me show you what's in your bag. It's an artistic inspiration. It is something that transforms, is wonderful, and is with us in our lives.

Look, it came out.

thank you for listening.

(applause)

Today, I'm going to show you how this tablet and this virtual reality headset that I'm wearing will revolutionize the science classroom.

And I'm going to show you how science teachers can make their students more effective at learning.

Before I show you how all of this is possible, let me briefly talk about why it's important to improve the quality of science teaching.

As you all know, the world is growing at a rapid pace.

Behind this growth, there are many challenges that need to be overcome, such as global warming, hunger, water shortages, eradication of diseases, and many more.

Who's going to lend a hand in solving such a big conundrum?

Ultimately, it's these young students.

They are the next generation of bright young scientists.

In many ways, we expect them to come up with new and great ideas to solve all the challenges that come their way.

A few years ago, with a business partner, I was teaching at a university to students who looked like this, and the students we were teaching looked like this.

(Laughter) Yes, this is the reality. Students get bored, they lose interest, they don't know why they want to study it, they don't even know why.

So we searched for a novel way of teaching, and it ended with a very disappointing result.

What we saw was how books became digital books, blackboards became YouTube videos, large hall classes became MOOCs, Massive Open Online Courses.

If you think about it, all we're doing here is offering the same content to more students in the same format. And that's great, don't get me wrong.

So we decided to look elsewhere

And it turns out that flight simulators, when combined with real-world flight training, have repeatedly proven to be very effective.

I came up with the idea of ​​applying it to science classes.

I wondered if I should build a virtual lab simulator.

so i tried

What we wanted to do was basically create a fully recreated, personalized virtual reality lab where students would be able to mimic mathematical experiments as if they were in the real lab.

But it wasn't just a mock-up, so we decided to work with top universities like MIT to create a simulator so advanced that it could teach students about cutting-edge cancer research.

When students were able to simulate experiments before entering a real lab, universities suddenly could save millions of dollars.

Not only that, but students were able to understand what was going on inside the simulated device at a molecular level.

On top of that, we were able to do experiments that were too dangerous in the lab.

For example, you can learn about Salmonella, an important topic that many schools have not taught for safety reasons.

And of course, after the test, the teacher can use the dashboard to see how all the students are progressing.

But that's not all, because understanding the meaning is so important to keep students interested in class.

So we brought in a game designer to come up with a story that was fun and engaging.

For example, in this class, students must use the scientific knowledge of a learning task to solve a "CSI: Crime Scene Investigation"-style murder mystery.

When I started doing all of this, the response I got was very positive.

We've got 300 students here, and they've taken the CSI murder mystery seriously, and they've learned the science of the challenge.

One of the most moving moments was when a student came to me after class, completely surprised and confused, and said, "I've been in the virtual lab for two hours, and I haven't looked at Facebook once in the middle of it."

(Laughter) For students, it's about being so involved and immersed.

To understand how it really worked, a learning psychologist surveyed 160 students, from Stanford University and the Technical University of Denmark.

divide the students into two groups

One group used a virtual lab simulator and the other group learned through traditional teaching methods, and both groups had the same amount of class time.

Interestingly, tests were administered before and after the experiments to clearly measure student learning outcomes.

What they found was that using the virtual lab made learning a whopping 76 percent more efficient than traditional learning methods.

And even more interestingly, in the second part of this study, we also looked at the influence of teachers on learning.

What they found was that combining virtual labs with teacher guidance and mentoring increased learning efficiency by 101 percent, meaning that for the same amount of time, the teacher's impact was doubled.

A few months ago, we started asking ourselves, we have an amazing team of experts -- learning psychologists, teachers, scientists, game developers -- and we decided to keep asking ourselves, how can we continue to invent new educational concepts?

And I'm happy to be here today to share with you what we've come up with and what we've worked so hard to create.

I will briefly explain what

Basically, you use your cell phone - because most students already have a smartphone - and connect it to these cheap VR goggles.

Now you can literally step inside the virtual world.

I'd encourage a few people in the room to try it out, but I think they'll see just how immersive it can be if they actually experience it.

It feels like you've really stepped into this virtual lab space.

can you see me on the screen

Venue: visible

Michael Bodeker: Good!

Right now, my cell phone is a complete simulation of an Ivy League lab with an amazing suite of million-dollar machines that you can operate.

For example, you can use this pipette to do an experiment.

We have an E-Gel here, a PCR machine, oh look, a next-generation sequencer (NGSM), and an electron microscope.

Yes, it would be amazing to have an electron microscope in your pocket.

I have my computer here, and I can do all sorts of experiments with this machine.

There's a door here, so you can do other experiments in other labs.

here is my study tablet

It's an intelligent tablet, so you can search for relevant theories and read them.

As you can see, it reacts interactively.

You can watch videos and information related to the experiments that we're doing here right now.

Marie will be there when you come here

Marie is my teacher, my lab assistant, and she guides me through this entire lab.

And very soon, real teachers will be able to teleport into this pseudo-space that I'm in right now, and help and guide them throughout this experiment.

Before I end my speech, let me show you something even cooler, something that's not possible in a real lab.

here is the PCR machine

Let the experiment begin

I shrunk my body to a million times smaller, molecular size, try it, because it feels really small.

Now I'm standing in this device looking at DNA and molecules.

You can also see the polymerase

Here you can see DNA being replicated millions of times in a test tube, just like it happens in our bodies.

can understand how everything works

I hope you can get a sense of the possibilities that these new teaching methods hold.

I'd like to highlight that everything you've just seen can be used on iPads and laptops without VR goggles.

there's a good reason for that

We need teachers who embrace new technologies in the classroom to empower and inspire the next generation of scientists.

So in many ways, we believe that the next big breakthrough in science education is no longer a matter of technology, but a decision on the part of teachers to adopt and use these technologies that are available in the classroom.

So I hope that more universities, schools and teachers will work with technology companies to realize their potential.

Finally, I would like to share a little anecdote that inspired me to dream.

It's the story of Jack Andreika.

I'm sure some of you already know

When Jack was 15 years old, he invented a new, inexpensive, and revolutionary method for diagnosing pancreatic cancer.

And when Jack explained how he made his breakthrough, he also talked about the wall he hit to get there.

The barrier was that I was not granted access to the lab due to my inexperience.

What if I could take the multi-million-dollar virtual labs of Ivy League universities and give them to students like Jack all over the world, and give them the latest, most advanced machines imaginable?

Imagine an environment like that that gives great power and fresh ideas to the next generation of talented young scientists who are going to change the world with their innovative ideas.

thank you

(applause)

Hello

I have a question for the audience: Did you ever lie as a child?

Raise your hand if you've lied

Oh, you're the most honest people I've ever met

(Laughter) Now, for the last 20 years, I've been studying how children learn to lie.

And what I want to share with you today are some of our research findings.

But first, I'd like to tell you about Richard Messina, a friend of mine and an elementary school principal.

he got a call one day

The person on the phone said, "Miss Messina, my son Johnny will be out sick today."

Principal Messina asked, "Who are you?"

Then the caller said, "I am my father."

(Laughter) This story -- (Laughter) really illustrates three common beliefs that adults have about children and lies.

First, it is after elementary school that children begin to lie.

Second, children are bad at lying.

Adults can easily spot children's lies

And third, when a very young child tells a lie, that child has a character flaw that makes him a lifelong pathological liar.

Now, it turns out that all three of the things I just said were wrong.

We are playing a guessing game with children all over the world.

for example

In this game, children were asked to guess the number written on the card.

I tell the kids that if they win the game, they'll get a big prize.

But in the middle of the game, we run errands and leave the room.

I'll tell you not to look at your card when you leave the room.

Of course, there are hidden cameras in the room, and you can see everything the kids are doing.

The desire to win the game is so strong that over 90 percent of children look at their cards as soon as we leave the room.

(Laughter) Now the big question is, when we go back and ask the kids if they didn't look at their cards, will the kids who do will admit their wrongdoing or lie?

And regardless of gender, country or religion, 30 percent of two-year-olds lie and 70 percent tell the truth.

3-year-olds are 50% lying and 50% telling the truth.

By the age of four, over 80 percent will lie.

And after the age of four, most children lie.

As we've just seen, lying is an essential part of growth.

And some children lie as young as two years old.

Now let's take a closer look at young children.

Why do young children sometimes lie, but not all lie?

When you cook, you need good ingredients to make good food.

A good lie requires two main ingredients.

The first main ingredient is theory of mind, or mind reading.

Mind-reading is the ability to know that different people have different knowledge in the same situation, and the ability to see the difference between what you know and what the other person knows.

The art of mind reading is important to lying.

lies are established

The second main ingredient of good lying is self-control.

It's the ability to control your speech, your facial expressions, your body language in order to tell a convincing lie.

And what we found is that children with developed mind-reading skills and self-control are liars at an early age and high-level liars.

I later found out that these two skills are essential for anyone to thrive in society.

In fact, deficits in mind-reading and self-control are associated with developmental disorders such as attention-deficit/hyperactivity disorder and autism.

So when your child tells a lie for the first time at age 2, don't be alarmed and congratulate them (Laughter) because it's a sign that they've reached a milestone in their normal development.

Well, are children good at lying?

Do you think it's easy to spot a child's lies?

wanna try it?

let's try

Please watch two videos

The video shows the children's reaction to the researcher's question: "Did you peek?"

Guess which kid is lying and which kid is telling the truth

This is my first child.

May I?

(Video) Adult: Did you take a peek? Children: No

Kang Li: Then this is the second child.

(Video) Adult: Did you take a peek? Children: No

Lee: Now, if you think the first child is lying, please raise your hand.

Raise your hand if you think the second child is lying.

Now let me tell you the answer: the first child is telling the truth and the second child is lying.

It seems like you're bad at spotting children's lies.

(Laughter) Now, we played a similar game with dozens of adults from all walks of life.

And I showed adults a lot of videos

In half the video, the child was lying.

the other half was telling the truth

Now let's look at the performance of the adults in the game.

There are as many people who are telling the truth as there are liars, so you have a 50 percent chance of getting it right, even if you answer bullshit.

So a 50 percent accuracy rate means you can't spot a child's lies.

So let's start with undergraduates and law school students, because they're usually inexperienced with children.

They can't see through children's lies

Results are close to a fluke

But what about social workers and child protection lawyers? People who work with children on a daily basis

Can they see through the lies of children?

no i can't see through

(Laughter) But what about judges, customs inspectors, and police officers who routinely deal with liars?

Can they see through the lies of children?

no i can't see through

who has children?

Can you see through the lies of strangers?

no i can't see through

So what if it's my son's lie?

no i can't see through

(Laughter) (Applause) So you might be wondering, why is it so hard to detect lies in children? and

Let me demonstrate this with my son Nathan.

This is the look on Nathan's face when he's lying.

(Laughter) When children lie, their facial expressions are usually neutral.

But behind that neutral expression, there's certainly a lot of emotion behind it, fear, badness, embarrassment, and maybe even the enjoyment of lying.

(Laughter) Unfortunately, those feelings are fleeting and hidden.

Most of the time we can't see it

For the last five years, I've been trying to find ways to uncover these hidden emotions.

and discovered

As you know, under the skin of the face is a rich network of blood vessels.

Every time you switch emotions, the blood flow in your face changes subtly.

This change is governed by the autonomic nervous system, which cannot be consciously controlled.

By looking at changes in facial blood flow, we can uncover hidden emotions in a person.

Unfortunately, these emotional changes in facial blood flow are so subtle that they're difficult to see with the naked eye.

So, to help reveal human facial expressions, we developed a new imaging technique we call transcutaneous optical imaging.

To do this, we use a regular video camera that records people hiding different facial expressions.

And if we apply our image processing technology, we can extract changes in facial blood flow into transcutaneous images.

By viewing transcutaneous video images, we can now easily see changes in facial blood flow associated with a variety of hidden emotions.

And with this technology, we're also able to uncover the hidden emotions associated with lying, so we can see through people's lies.

We can detect lies non-invasively, remotely, at low cost, with an accuracy rate of about 85 percent, much higher than a fluke.

And we discovered the Pinocchio effect.

No, it's not this Pinocchio effect.

(Laughter) This is the real Pinocchio effect.

When a person lies, blood flow to the face decreases in the cheeks and increases in the nose.

Of course, lying isn't the only condition that awakens our hidden emotions.

So we ask ourselves, other than lie detection, how can this technology be used? and

One of the applications is in the field of education.

For example, this technology can help a math teacher identify which students in a classroom are feeling uneasy about the content of the lesson, and identify those students who should be remedied.

This technology can also be used for health management.

For example, every day I Skype with my parents, who live thousands of miles away.

With this technology, we can not only find out what's going on in our parents' lives, but we can simultaneously monitor their heart rate, their stress levels, their moods, whether they're in pain.

And maybe the risk of heart attack and high blood pressure in the future.

You may ask, can this reveal the true intentions of politicians? and

(Laughter) Like during a debate.

the answer is yes

Using television footage, we will be able to see through politicians' heartbeats, their moods, their stress, and maybe in the future.

You can also use this technology for marketing research, for example, to learn whether consumers like a product or not.

You can also use it for dates

For example, when someone smiles, this technology can help you decide whether the person you're dating really likes you, or if it's just politeness.

And in this case it's just polite

(Laughter) Transcutaneous optical imaging technology is in the very early stages of development.

There will be many applications that we don't know about.

But one thing is certain: the way we lie will be different than it is today.

thank you

(Chinese) Thank you

(applause)

I have something to confess

I like to rummage through the junk that people throw away.

But I'm not doing anything creepy

Most of the time, I'm just looking for old electronics that I can use in my workshop.

I'm a CD-ROM drive fetish

Each one has three different motors so you can make things that move.

It has a switch so you can turn it on and off.

It even has a laser, so you can turn a cool robot into something awesome.

I've made a lot of things out of scrap parts, and some of them are pretty useful.

Listen, for me, trash gives me the opportunity to be creative, to make things that amuse me, to have fun and have fun.

I love it, so I made it part of my job.

I lead a biology lab at a university where we value curiosity and exploration above all else.

We're not trying to focus on any particular problem, nor are we trying to figure out a particular disease.

It's just a place where people come in and ask interesting questions and find answers.

A long time ago, I realized that giving people the challenge of building the device they need out of the junk I found was a great way to foster creativity.

What happened was that artists and scientists from all over the world came to my lab.

Not just because we value original ideas, but because we test and validate them with scientific rigor.

One day, I started taking apart the junk to make something, and that's when the idea hit me: Could we treat biology like hardware?

Could we take biological systems apart, put the parts together, and reassemble them in new and creative ways?

We've been working on this in the lab, and I'd like to show you the results.

What kind of fruit do you think this is?

(audience) Apple!

(Andrew Pelling) That's right, apples.

One more thing I want you to notice is that this one is redder than a normal apple.

because they cultured human cells inside

They took a pristine Macintosh apple, removed all the apple cells and DNA, and transplanted human cells.

When you remove all the apple cells, all that's left is this cellulose skeleton.

This creates the shape and texture of the plant.

You can see a little hole, but all that was here was apple cells.

Then we transplanted mammalian cells, which you can see in blue.

What happens is that it multiplies and completely fills the framework (scaffolding material).

As eerie as it is, it makes you wonder what it would be like if our anatomy were organized this way.

What we've learned from pre-clinical studies is that these scaffolds can be implanted into the body, and the body pumps the cells, supplies blood, and keeps these cells alive.

At this stage, people started asking me, "Andrew, is it possible to make a body part out of an apple?"

"That's what the lab is good at," I said.

(Laughter) My wife and I came up with this.

She's a musical instrument maker, and she makes a living by cutting wood.

So I asked her, "Could you literally make an ear out of an apple?"

made it

take this to the lab

we started preparing

I understand how you feel

(Laughter) It's a good lab, right?

(Laughter) If you use this to grow cells,

Now this

Now, my lab isn't in the business of making ears.

There are people who have spent decades trying to create artificial ears.

The problem is that commercial scaffolding materials are very expensive and have problems because they're patented, they're made from animals, they're cadavers.

We used apples, and they're practically free.

The real beauty is that it's easy to make

The equipment you need can be made out of junk, and for the main process all you need is soap and water.

I published all the steps online as open source.

And then I started a purpose-built company to develop kits that anyone with a sink and a soldering iron can build at home.

If we could do this -- it would be wonderful if one day we could repair, regenerate, and expand our bodies with the materials we made in our kitchens.

Speaking of the kitchen, here's the asparagus.

It's delicious and when you eat it, your pee smells weird

(Laughter) I've been in the kitchen and I've noticed that if you look into an asparagus stalk, you can see these tiny tubes.

If you take this in the lab, you can see how the cellulose creates these structures.

This reminds me of two things: the blood vessels, and the structures and tissues of the nerves and the spine.

And that begs the question: can we grow axons and neurons inside this tube?

Because if we can do that, we might be able to use asparagus to reconnect the severed nerve ends.

Even the spinal cord may be possible

But don't get me wrong, this is a very high hurdle, and it's very difficult.

But we're the only ones using asparagus.

(Laughter) Now we have some very promising initial data.

We're partnering with tissue engineers and neurosurgeons to see what we can do.

Look, all the work I've shown you, all the things that I've created around me on this stage, and all the other projects that my lab has been involved in, all of which I've made playfully out of the trash you've thrown away.

Playfulness is the essence of my scientific practice.

So this is how I got creative and creative and decided to try and make a human ear out of an apple.

The next time you find something old -- broken, non-functional, piece of junk -- think of me.

because i want it

(Laughter) I'm serious.

Thank you

(applause)

Raise your hand, please raise your hand if you know one of them

wow almost everyone

People who have made a name for themselves in their respective fields.

Do you know what they have in common?

all died of pancreatic cancer

It's very sad, but the visibility of these people has raised awareness of how deadly pancreatic cancer can be.

Pancreatic cancer is the third deadliest cancer, and this patient's five-year survival rate is only 8 percent.

That's a very low number, especially when compared to breast cancer survival, which is close to 90 percent.

So being diagnosed with pancreatic cancer is like being sentenced to death.

But the amazing thing is that in the last 40 years, that survival rate hasn't changed one bit, even though survival rates for other cancers have gone up significantly --

So how can the treatment of pancreatic cancer be more effective?

As a biomedical entrepreneur, I love working with seemingly impossible problems, understanding their limitations, and trying to find new and innovative solutions that can change the outcome.

The first problem with pancreatic cancer is that the pancreas is right in the middle of the abdomen.

On the slide, the pancreas is orange.

I can't see clearly unless I remove the other organs in front of it I can't see clearly unless I remove the other organs in front of it

It is also surrounded by vital organs such as the liver, stomach, and bile ducts.

It's their susceptibility to metastasizing to nearby organs that makes pancreatic cancer one of the most painful cancers.

Also, it is located in a location that is difficult to remove by surgery, and it is located in a location that is difficult to remove by surgery, and like breast cancer, surgery is not routinely performed.

For these reasons, chemotherapy is the only option left for pancreatic cancer patients.

This causes the following problem

Pancreatic cancer has very few blood vessels.

Why do tumor blood vessels matter?

Let's think about how chemotherapy works.

A drug is injected into a blood vessel, and the drug travels throughout the body and reaches the tumor.

It's like driving down the highway to get to your destination.

What if that highway doesn't have an exit to your destination?

You never reach your destination

That's exactly the same problem with chemotherapy to treat pancreatic cancer.

medicine circulates throughout the body

While healthy organs are subject to highly toxic effects, the tumor itself is rarely reached by the drug.

the effect of the drug is very limited

To target a specific organ, systemic therapy is not intuitively convincing.

However, over the past 40 years, a lot of money, a lot of research, a lot of effort has gone into developing powerful new drugs to treat pancreatic cancer, but nothing has changed about how the drugs are administered.

Despite these two problems, there is good news.

Together with his collaborators at MIT and Boston's Massachusetts General Hospital, he revolutionized the way cancer is treated, making local administration of drugs a reality.

In a nutshell, it's like you're parachuted to your destination and you don't have to go through the highway.

We developed something like this and put drugs in it.

It's flexible enough that you can fold it up and put it inside a catheter, and then you can implant it directly over the tumor with minimally invasive surgery.

The device is stiff enough that once it sits on top of the tumor, it acts to confine the tumor.

It physically prevents cancer from moving to other organs and prevents cancer from metastasizing.

And because the device biodegrades,

Once inside the body, it begins to break down, dissolve, and the drug inside is slowly and effectively delivered to its target site, something that is not possible with existing systemic therapies.

Preclinical studies have demonstrated that this topical approach can improve treatment efficacy by 12-fold.

By taking an existing drug and putting it where it's needed most, it's 12 times more potent than existing treatments and reduces systemic side effects.

We are constantly researching to take this technology to the next level.

Right now, we're in the final stages of preclinical testing on animals, a stage that must pass before we can submit to the FDA for clinical trial approval.

Today, the majority of pancreatic cancer patients die.

I hope that one day we can make pancreatic cancer patients less painful, they live longer, and pancreatic cancer becomes a curable disease.

By reimagining the way we administer drugs, we're not only making them less toxic and more potent, but we're opening the door to new and innovative solutions to most other impossible problems, whether it's pancreatic cancer or not.

thank you

(applause)

I worked as a war correspondent for 15 years before I realized I had a problem.

something went wrong inside me

It was the year before 9/11, America hadn't gone to war yet.

PTSD was also not mentioned

Nor was the relationship between war and trauma affecting the human psyche.

For several months, I worked with the Northern Alliance in Afghanistan, fighting the Taliban.

At that time, the Taliban had an air force, fighter planes, tanks, artillery, and we were attacked twice.

I have seen some very disgusting things

I never thought it would have that effect

I didn't really care

I went back to my hometown New York

One day I stepped off the subway and for the first time in my life I felt true fear.

I had a severe panic attack

I was much more scared than when I was in Afghanistan.

Everything I saw was trying to kill me, but I couldn't explain why.

The subway passes by at a tremendous speed

crowd of people

the lighting was too bright

Everything was loud and moving in a blink of an eye

I leaned against the pole and waited for it to subside.

I couldn't take it any longer, so I ran out of the subway station and walked to my destination.

Later it turned out to be short-term PTSD -- post-traumatic stress disorder.

Evolving as animals and as primates, humans who have survived peril respond to unfamiliar sounds when their lives are in danger.

I am a light sleeper and wake up quickly

I am having nightmares and flashbacks where I am about to be killed

You're more likely to get into fight situations, you're more likely to get angry, and you're more likely to be depressed because you're a little more socially isolated.

this is a defensive reaction

It's not very pleasant, but it's better than having your mind eaten away.

most people recover quickly

a few weeks or months

Panic attacks continued, but finally subsided.

I didn't see any relevance to the wars I'd seen.

I was crazy, but I thought it wouldn't happen again.

But 20% of people have chronic, long-term PTSD.

they are unable to adapt to temporary dangers

Unable to adjust to daily life without support Unable to adjust to daily life without support

People most likely to develop long-term PTSD are those who were abused as children, those who had childhood traumas, those who had low levels of education, or those who had a family history of mental illness.

If you have a sibling with schizophrenia and you went to the Vietnam War, you're more likely to come back from Vietnam and develop long-term PTSD.

As a journalist, I started researching this, and I realized something strange was going on.

The stats showed a strange trend

In the wars that the United States has entered, including the Civil War, the intensity of the fighting has weakened.

casualty rate went down

Disability rates have increased

These two percentages should point in the same direction, but they're trending in the opposite direction.

In the recent wars in Iraq and Afghanistan, the casualty rate is thankfully about one-third that of the Vietnam War.

Disability rates are three times higher

About 10% of the U.S. military engages in actual military operations, 10% or slightly less.

I shoot people, I kill people, I watch people get shot and my friends get killed

It's a very traumatic experience

But it's only 10% of the US military.

But about half of the U.S. military is asking the government for some form of compensation for PTSD.

Strictly speaking, suicide does not fall into this category.

I'm sure you've heard the sad statistic that an average of 22 veterans per day commit suicide in this country.

But we don't know that the vast majority of those who commit suicide are Vietnam War veterans, and perhaps there really isn't a causal connection between their generation, or what they killed themselves, and the Vietnam War 50 years ago.

In fact, there is no statistical link between war and suicide.

Fighting more combat in the military doesn't seem to increase suicide rates.

In fact, one study found that those deployed to Iraq or Afghanistan were actually only slightly less likely to commit suicide later.

I studied anthropology at university

Fieldwork in Navajo Conservation Area

I wrote a paper on Napajo long-distance runners.

Since I recently started researching PTSD, I've been thinking,

Going back to the research I did when I was younger, I think the Navajo, the Apache, the Comanche are very warlike tribes, but I don't think they got PTSD like we did.

I think when the warriors who fought against the U.S. military and fought between the tribes returned home, they were able to integrate more easily into tribal life.

Perhaps the determinants of long-term PTSD are not what happens on the battlefield, but the returning society.

If you return to a close-knit, cohesive tribal community, you can overcome trauma quickly.

And if you go back to modern society, where relationships are tenuous, you may be traumatized for life.

So the problem is not with the veterans, but with us.

Admittedly, modern society is harsh on the human psyche by our standards.

As societies became more prosperous, suicide rates went up, not down.

People living in modern societies are eight times more likely to be depressed than people living in poor agricultural societies.

Our modern world probably has the highest rates of suicide, depression, anxiety, loneliness, and child abuse in human history.

One study compared women in Nigeria, one of the poorest countries in Africa with political instability, violence and corruption, to women in North America.

Urban women in North America had the highest rates of depression.

and the richest people

let's get back to the US military

10% experienced combat

About 50% applied for compensation for PTSD

About 40% of veterans who were not traumatized in their country of assignment suffer dangerous levels of alienation and depression upon returning home.

what happened to them?

I don't know why 40% of people feel this mysterious pain.

It's probably something like this: I think they're experiencing a kind of tribal closure in the unit they're assigned to.

We ate together, slept together, and worked together.

We trusted each other to survive

And then when you go home, you lose all of that stuff, and then you go back to society -- modern society, and it's a society that's tough on people, whether they've been in the military or not.

it's tough for everyone

Although we continue to look at trauma and PTSD,

For many military personnel, trauma may not be a problem For many military personnel, trauma may not be a problem

Of course, military personnel are traumatized and need treatment.

But many military personnel may, in truth, suffer from some form of alienation.

If PTSD is the wrong term, changing the way you say it and how you think about it can help a little.

Post-Military Alienation Syndrome (PDAD)

Just call it that, and you'll probably get away with it. You don't have to assume that you've been traumatized to explain the emotions you actually feel.

In fact, alienation is a very dangerous emotion.

Alienation and depression drive suicide.

those people are in danger

It is very important to understand why

The rate of PTSD in the Israeli military is about 1%.

The reason the numbers are so low is because everyone in Israel is enlisting.

Coming back from the front lines doesn't change your environment from military to civilian.

We will return to a society that understands the military.

They're all military veterans or about to enlist.

We all understand the military situation.

It's as if we're all in one big tribe.

As you know, if you catch a lab rat, shock it, and put it in a cage alone, the traumatic symptoms will last forever.

If you put the same rat in a cage with its mate, after two weeks it's going to be pretty good.

After 9/11, New York City's homicide rate dropped by 40 percent.

Suicide rate has also decreased

After 9/11, New York's violent crime rate also dropped.

Even former war veterans who suffered from PTSD said their symptoms had lessened after 9/11.

Because when a society as a whole is traumatized, it doesn't fall apart, it depends on each other.

unite and come together

Fundamentally, we have such a strong bond that we feel comfortable in the process of coming together, and it helps even people with mental health issues.

Psychiatric ward admissions decreased in the London bombing.

At one point, the homeland that the American soldiers returned to was also like that.

we work together

try to understand the threat to them

tried to help ourselves and the world

that has changed

Today, American soldiers -- veterans -- are returning to a country split into two major political parties, where they literally call each other treason, enemies of the state, and accuse them of undermining their own security and welfare.

The gap between rich and poor is wider than ever

it's only going to get worse

racial relations are the worst

Racial injustice causes demonstrations and riots in the streets Racial injustice causes demonstrations and riots in the streets

And veterans know that no tribe, no platoon, can survive doing that.

we got used to it

A veteran returns from the battlefield and sees his country with fresh eyes.

looking at the situation

they fought for this country

That's why I get depressed

I'm afraid

Sometimes we ask ourselves, can we save our veterans?

But I think the real question is can we save ourselves?

If we can save it, I think the veterans will be better off.

It's time for this nation to come together if we want to help the soldiers who fought to defend our country.

thank you

(applause)

When railroads began connecting regions and transporting people, many thought they wouldn't replace horses.

In less than 100 years, people will repeat the same predictions—cars, phones, radios, televisions, computers.

Despite the many things that can make it obsolete,

Some experts even argued that such a thing would never become widespread.

Of course, we can't predict exactly what the future will bring, or what new inventions will emerge.

But we also fail to predict how current technology will change the future.

A recent study found that it's the same when it comes to ourselves: people are not very good at predicting changes in their future.

In a 2013 paper, "The Illusion of the End of History," three psychologists discuss our weak anticipation of our own change. The title comes from political scientist Francis Fukuyama's prediction that "liberal democracy is the final form of politics."

They surveyed 7,000 people between the ages of 18 and 68.

Half of them were asked to describe their current personality, values ​​and preferences, along with how they were 10 years ago.

The other half were asked to answer where they are today and where they see themselves 10 years from now.

Based on the answers, we calculated the degree of change experienced or expected by each subject.

For each age group, we compared the magnitude of change experienced and expected.

For example, comparing the amount of change an 18-year-old expects to the amount of change a 28-year-old experiences.

We found that, across all age groups, the younger expected changes were much smaller than the older ones experienced.

A 20-year-old expects to still like the same foods when he's 30, but a 30-year-old has different tastes than he did 10 years ago.

A 30-year-old expects to be friends with the same people at 40, but a 40-year-old has lost touch with the friends he had 10 years ago.

40-year-olds expect their values ​​to stay the same, but 50-year-olds have changed their minds.

Overall, older people change less than younger people, but they also underestimate how much they will change in the future.

At any point in our lives, we have the illusion of the end of history, and we tend to think that personal change is largely a thing of the past.

As a result of this way of thinking, we tend to overinvest in future choices based on current preferences.

On average, people would pay more than 60 percent more money to see their favorite musicians today than they would pay today to see a musician they liked 10 years ago.

The impact of going to a concert isn't huge, but we tend to make similar miscalculations about more serious things, like buying a home, choosing a spouse, choosing a job, and so on.

But there's no way to really predict what your future tastes will be.

Without the illusion of the end of history, it would be difficult to plan for the long term.

So the illusion of the end of history applies to individual lives, but what about the wider society?

Are we assuming that what we have now will continue?

If that's the case, I'm glad there are plenty of reminders out there that the world can change and often get better.

It can be both a source of comfort and a source of concern that our point in history is not the end of history.

I want to talk to you about sex for money.

I'm not one of those people you've heard before who talk about prostitution.

Unless I'm a police officer or a social worker

I'm not a researcher, journalist or politician.

As you can guess from the introduction by Maryam, I'm not even a nun.

(Laughter) Many of those people would say that prostitution is degrading, that no one wants to do it, that it's dangerous, that women can be abused and even killed.

Many of these people say, "We need laws to enforce this!"

You might also think it makes sense

So did I until the end of 2009, when I was working two minimum-wage jobs.

Monthly salary disappeared to pay for overborrowed money

I was exhausted and life was stuck

I thought, like other women, that sex was a better way to make money.

But don't get me wrong, it would have been so much better if I had won the lottery.

But that wasn't going to happen anytime soon, and the rent was due.

So I signed up for my first shift at the brothel.

Over the years, I've had a lot of time to think.

I reconsidered my old thoughts about prostitution.

It got me thinking a lot about consent and how we work under capitalism.

I thought about gender inequalities and the sexual and reproductive labor that women are forced to do.

I have been exploited and beaten at work

So I thought about what I could do to protect other sex workers from all this.

you may have thought

In this talk, I'll introduce four legal approaches to sex work that are being used around the world, explain why they don't work, and why banning the sex industry actually exacerbates the harms to which sex workers are more likely to suffer.

And then I'll tell you what we, as sex workers, really want.

The first approach is total outlawing.

Half the world, like Russia, South Africa, most of the United States, will crack down on sex work by making it illegal for everyone involved.

prostitutes, prostitutes, and third parties.

Legislators in these countries want to prevent prostitution out of fear of being arrested.

But when it comes to choosing between obeying the law and supporting yourself and your family, you choose to work and take risks.

Illegalization is also a trap

Having a criminal record makes it harder to get a regular job.

Employers won't hire you

If you still need the money, you're stuck in the more flexible black economy.

Outlawing will force prostitution to continue, with the exact opposite of its intended effect.

Outlawing also hurts the country itself.

In many places, people are threatened to pay bribes or demanded to have sex by police officers to avoid arrest.

For example, police and prison guards in Cambodia have been documented to subject sex workers to what can only be described as torture, including threats at gunpoint, beatings, electroshocks, rape, and deprivation of food.

There's still something to worry about. If you're a prostitute in Kenya, South Africa, or New York City, you can be arrested by the police for carrying a condom, because condoms are legally used as evidence of prostitution.

This obviously increases the risk of HIV.

Imagine doing yourself a disservice if you were caught carrying a condom.

Wouldn't that be a great reason to keep it at home?

Sex workers working in these places face the difficult choice of risking arrest or engaging in unsafe sex.

Which one would you choose?

Do you go to work with a condom?

What if you're afraid that the police will put you in a car and rape you?

The second approach to sex work regulation is the partial decriminalization seen in these countries. While the sale of sex itself is legal, peripheral activities like running brothels and street touts are prohibited.

These laws can be found in England and France, where they tell sex workers, "You can buy and sell sex, but do it privately and in private."

By the way, "running a brothel" is defined as two or more sex workers working together.

When this is illegal, many people work alone, which of course leaves them vulnerable to violent criminals.

But even if we break the law and try to work together, we're still vulnerable.

A few years ago, a friend of mine was worried after being assaulted at work, so I suggested that I meet a client in my room.

In the meantime another man became violent

I said to the man, "If you don't leave, I'll call the police."

The man looked at the two of us and said, "You can't call the police.

If we work together, it's illegal here."

That's right

The man eventually walked away without violence, but when he learned that we were doing something illegal, he became embittered and threatened.

I was confident that it would be okay to do so.

A ban on street prostitution does more harm than it prevents.

First, to avoid being arrested, street prostitutes stay hidden, which means they either work alone or in remote, dark woods, where they are more vulnerable to attack.

If you're caught street prostitutes, you'll have to pay the fine.

How can I pay the fine without attracting customers to the streets again?

In the first place, what I saw on the street was an act that came from the need for money.

As the fines pile up, it becomes a vicious cycle of prostitution to pay prostitution fines.

Let me tell you the story of Mariana Popa, who worked in Redbridge, east of London.

Street prostitutes in her area waited for customers in groups for safety, to warn each other to avoid dangerous people.

But a police crackdown on sex workers and clients forced her to work alone to avoid arrest.

She was stabbed to death in the early hours of October 29, 2013.

She'd been working later than usual to pay the fine for street prostitution.

If banning hurts sex workers, why not ban those who buy sex?

This is the third approach that I'm going to talk about, the Swedish or Nordic model.

The idea behind this law is that prostitution is inherently harmful and that removing this option will help sex workers.

This approach has been described as a way to "cut off the demand," and there is growing support for it, but there is no evidence that it works.

Prostitution in Sweden hasn't gone down.

Why do you think?

Because prostitutes have no other way of earning money.

If you still need the money, the effect of declining the industry is to lower prices or offer more dangerous sexual services.

If you want more customers, you'll also need help from your manager.

You see, instead of stopping what's called "pimping," laws like this create room for potentially exploitative third parties to intervene.

For my own safety, I do not accept bookings from unknown numbers.

If I'm going to your home or hotel, I try to ask for your full name and personal information.

If you work in the Swedish model, your customers will be afraid to give you information.

I'm forced to take appointments from men who can't be tracked down, even if they later become violent.

If you want money from your customers, you have to protect them from the police.

Even if you work outside, you have to work alone or in secrecy, as if you're doing something illegal.

That means you have to get in the car quickly, have less time to negotiate, and you have to make decisions in the blink of an eye.

Is this person dangerous or just insecure?

Can you take this risk?

Can you choose not to take risks?

What I hear all the time is the idea that prostitution is okay if it's legalized and regulated.

This approach is called legalization, and it's being used in places like the Netherlands, Germany, and Nevada in the United States.

But this is not a good human rights model.

In a state-regulated system of prostitution, paid sex is only allowed in legally designated areas and buildings, and sex workers are subject to special rules, such as registration and mandatory health checks.

Regulation is a nice word, but politicians deliberately make regulation around the sex industry expensive and difficult to comply with.

The result is a two-tier system of legal jobs and illegal jobs.

sometimes called "indirect delegitimization"

Wealthy and well-connected brothel owners are able to abide by regulations, but the marginalized are unable to overcome numerous hurdles.

Even though it's theoretically possible, obtaining permits and appropriate buildings takes time and money.

This option is out of the question for someone who desperately needs money tonight.

You may be a refugee or a person fleeing domestic violence.

In this two-tier system, the most vulnerable people are forced to do illegal work, and thus expose themselves to all the dangers of delegation that I mentioned earlier.

Now-

All attempts to regulate or prevent sex work seem to put prostitutes at greater risk.

Fear of law enforcement leads to working alone and in the dark, to abusive behavior in the knowledge that customers and even the police can escape.

Far from stopping prostitution, fines and criminal records encourage continued prostitution.

A crackdown on prostitutes will force sellers to take more risks and rely on exploitative managers.

These laws foster stigma and hatred against sex workers.

When France briefly adopted the Swedish model two years ago, it prompted civilians to launch vigilante attacks against street prostitutes.

A poll in Sweden shows that far more people want sex workers arrested than they did before the law came into force.

You might be wondering, if the ban is so harmful, why is it so widely accepted?

First, sex work is, and always has been, a way of survival for disfavored minorities: people of color, immigrants, people with disabilities, LGBTQ people, especially transgender women.

It is these people who are being exposed and punished by prohibitive laws.

this is not a coincidence

These laws have political support precisely because they target people that voters don't want to see or hear.

What other reasons would people support a ban?

Many people fear human trafficking, and it's understandable.

They think they can save foreign women who are kidnapped and sold into sex labor by banning the sex industry.

Now let's talk about human trafficking

Forced labor is real in many industries, especially when the workers are immigrants and vulnerable, and this problem must be resolved.

But this should be done by regulation of specific abuse practices, not entire industries.

When 23 illegal Chinese immigrants drowned while harvesting cockles in Morecambe Bay in 2004, there was no move to ban the entire fishing industry to help victims of human trafficking.

The obvious solution is to give workers better legal protections so they can resist abuse and report it to the authorities without fear of arrest.

The frequent use of the term human trafficking suggests that all illegal worker prostitution is coercive.

The reality is that many immigrants, out of economic necessity, make their own decisions and put themselves in the hands of traffickers.

Many people do so knowing that once they reach their destination, they will engage in prostitution.

And yes, these traffickers often demand exorbitant fees, force immigrants to do things they don't want to do, and even abuse them when they're vulnerable.

This isn't just true in prostitution, but it's true in farming, it's true in the service industry, it's true in the domestic industry.

Ultimately, no one wants forced labor, but many immigrants are willing to take this risk in return for what they leave behind.

If they can migrate legally, they don't have to put their lives in the hands of traffickers.

These problems also arise from the illegality of migration, and not just from the illegality of sex work.

This is a lesson from history

If you try to ban things that people want or need to do, whether it's drinking alcohol or crossing borders or having an abortion or prostitution, you create more problems than you solve.

Banning does little to change the number of people who commit the act.

But it does make a big difference as to whether it's safe to do so.

What other reasons would people support a ban?

As a feminist, I know that the sex industry is a place where social inequalities are entrenched.

In fact, most prostitutes are men with money, and most prostitutes are women with no money.

I think you can agree with this.

In a better, more equal world, far fewer people would sell sex for a living, but laws alone won't make for a better world.

If someone is prostituted because they are poor, or because they are homeless, or because they are illegal immigrants and can't find work legally, then depriving them of that option doesn't make them less poor, or get a house, or get a residency permit.

People think prostitution is degrading.

Ask yourself, is it more demeaning than starving yourself or your child?

There's no movement to ban wealthy people from hiring babysitting or doing manicures, even if those workers are poor immigrant women.

What some feminists don't want to talk about is especially poor immigrant women who are prostitutes.

It's understandable that the sex industry evokes strong emotions.

People have all sorts of mixed emotions when it comes to sex.

But you can't make policies based on emotions alone, and you can't ignore people, especially those who are affected by policies.

If we focus on banning sex work, we end up worrying less about the underlying causes and more about superficial inequalities between specific genders.

People are obsessed with questions like, "So, would you want your daughter to do that job?"

this is the wrong question

Instead, think of your daughter as actually doing it.

Is it safe for your daughter to work tonight?

Why isn't it safer?

Now, I've introduced you to full decriminalization, partial decriminalization, the Swedish or Nordic model, legalization, and we've seen why they're harmful.

The question I've never heard before is something like, "What do sex workers want to do?"

After all, we are the ones most affected by the law.

New Zealand decriminalized sex work in 2003.

The important thing here is that de-criminalization is not the same as legalization.

Decriminalization means removing punitive laws against the sex industry and treating sex work like any other profession.

New Zealand allows for multiple jobs for security reasons, and sex worker employers have a responsibility to the state.

Sex workers can refuse to see clients at any time and for any reason, and 96 percent of street hookers say they feel their rights are protected by the law.

The number of people engaged in sex work in New Zealand has not increased, and de-criminalization has made it safer.

What we have to learn from New Zealand is not only that certain laws and regulations are effective, but very importantly, the participation of sex workers in the development of this legislation, the New Zealand Prostitutes Collective.

There was a willingness to listen directly to the voices of sex workers in making sex work safer.

Here in England, I'm in the Sex Workers Open University and the England Collective of Prostitutes.

We are part of a global movement demanding decriminalization and self-determination.

The symbol of this global movement is the red umbrella.

Our call is backed by global organizations, including the Joint United Nations Program on AIDS and the World Health Organization, Amnesty International.

But we need more supporters

If you care about gender equality or poverty or immigration or public health, sex worker rights should also be an important issue.

Make our place in your activities

Don't just listen to the voices of sex workers, spread their voices.

Stand up to those who try to silence us, who say that prostitutes are overhyped as victims, that they're hurt and don't know what's good for them, that they're privileged and don't know the real struggle, that they don't represent the millions of voiceless victims.

The distinction between victim and self-reliant is fictitious.

It's an idea that exists to make it easier to ignore [the voiceless] without trusting sex workers [is it silenced?]

You will work for a living [It is a voice better not to hear]

sex work is also work

Like you, some people love this job, some people hate it.

Ultimately, most people have conflicting feelings.

But it doesn't matter how we feel about our work.

It doesn't matter how other people feel about our work.

The important thing is that we have the right to work in safe and acceptable conditions.

sex workers are human too

I've had complex experiences, and I've dealt with them in different ways.

But our demands are not complicated.

Ask any New York City courtesan, a Cambodian hooker, a South African street hooker, any of the women who used to work with me in SoHo, and they'll tell you the same thing.

It's the same thing when you talk to millions of sex workers and ask millions of sex worker organizations.

As workers, we demand full decriminalization and labor rights.

I'm just one sex worker on this stage today, but I'm here to bring you a message from the world.

thank you

(applause)

This man is James Reisen

As you may know, I'm a Pulitzer Prize-winning reporter for the New York Times.

Long before Edward Snowden became famous, he famously revealed in his book that the NSA was illegally tapping the phones of Americans.

But another chapter in the same book had a much longer lasting impact.

It depicted a catastrophic failure of an American intelligence operation, in which the CIA literally handed Iran the blueprints for an atomic bomb.

If you think I'm lying, read on.

really great story

The only thing I didn't like about that chapter was

is the US government

Nearly a decade later, Risen became the subject of a government investigation, and prosecutors forced him to testify in court about his sources.

So he's become an icon in recent high-profile government moves to prosecute whistleblowers and spy on journalists.

The press has the right under the First Amendment to publish confidential information in the public interest.

But even if the media gets information, if it can't protect the identities of the courageous people who provide it, it can't exercise its rights.

So when a government investigation loomed, Risen followed in the footsteps of his courageous reporters by rejecting the government's demands and telling them he'd rather go to jail.

From 2007 to 2015, Risen spent days in fear of being sent to federal prison.

But a few days before the trial, something strange happened.

After years of insisting his testimony was essential, the government suddenly withdrew all demands.

We live in the age of electronic surveillance, and reporters and informants have few places to hide.

So instead of trying to force testimony out of Risen, the government was able to grab the digital history and use it as evidence.

Prosecutors obtained Risen's call history in complete secrecy and without his consent.

I got my email history, my finances, my bank account information, my credit report, and even my travel history with flight lists.

Using this information, prosecutors prosecuted CIA whistleblower J. Sterling, the alleged source of Risen.

Unfortunately this is just one example

Despite President Obama's promise to protect whistleblowers, under this administration the Justice Department has filed more indictments than any previous administration combined.

It's pretty obvious what the problem is, especially when most government activity is classified.

Since 9/11, nearly all of the major national security news has come from whistleblowers visiting journalists.

So we're at risk of failing to do the job of reporting that the First Amendment is supposed to protect, because the government has put more scrutiny on everyone.

But just as governments can use technology to outmaneuver the rights of journalists, journalists can use technology to better protect their sources.

And it can be used as soon as the reporter contacts the source, rather than being used on the witness stand after being indicted.

Now, we have communication software that didn't exist when Risen wrote that book, and it's much less likely to be monitored than normal emails and phone calls.

One such tool is SecureDrop, an open source whistleblowing system developed by the late Internet guru Aaron Schwartz and now being improved by my non-profit organization, the Press Freedom Foundation.

Instead of sending an email, go to a news outlet's website, such as the Washington Post.

You can upload documents and submit information, just like a typical contact form.

The information is then encrypted and stored on a server that can only be accessed by that news organization.

So governments can't secretly enforce disclosures, and they can't access much of the information that governments want in the first place.

But SecureDrop is just one piece of the puzzle for press freedom in the 21st century.

Unfortunately, governments around the world continue to develop new intelligence technologies that pose a threat to us.

Going forward, it's up to us to ensure that we have the means to expose wrongdoing without being a tech-savvy whistleblower like Snowden.

It's also critically important to protect veterans' health care from new whistleblowers warning of overcrowded hospitals, new environmental activists to warn of water pollution, and Wall Street officials to warn of the next financial crisis.

Tools like these are there not only to help those brave enough to expose crime, but to protect our own constitutional rights.

thank you

(applause)

TED talks are all about the "big" things, but I want to talk about the really small things.

it's one small word

The word "misfit"

It's one of my favorite words. It's too literal.

Because "a person who misses (fails) to fit in"

You can say "a person who doesn't get used to it"

You could also use the phrase "a person who has not fully adapted to a new situation or environment."

I'm a tagged misfit

I've come to meet all the misfits in the venue, because there must be others besides me.

Let's talk about a misfit

Sometime in my early 30s, my dream of becoming a writer was right outside my door.

In fact, it was in my mailbox that I received a letter telling me that a short story I had written had won a major literary prize.

The short story told the story of my own life as a competitive swimmer, my terrible home life, and the loss and grief that drove me insane.

I was invited to New York for an award, an opportunity to meet famous editors, agents, and other writers.

If you're an aspiring writer, it's a dream come true, isn't it?

What did I do the day I got the letter?

In my own way, yes, I put the letter on the kitchen table, filled a large glass with vodka, ice and lime, and sat in my underwear for the whole day, just staring at the letter.

While looking back on my life full of setbacks

Who am I to go to New York and face a writer? I thought so

who am i

The answer is-

was a "misfit"

As is often the case, I grew up in a rough home and ran for my life.

He has a history of being married twice and both failing spectacularly.

I quit college not once, but twice because of bad grades, and maybe even a third time, but I won't say it here.

(Laughter) Once, I went into rehab for drug addiction.

I also experienced two wonderful prison lives.

To think that I would stand here behind the prosecutor.

(Laughter) But the real reason I became a misfit was that I didn't know how to live with the loss of my newborn daughter that day.

When I lost my baby, I was homeless for a long time. I slept under a bridge. I was a zombie of grief and loss.

If you live long enough, it may be a road that everyone goes through

The homeless are the bravest of the misfits, because they're normal people.

At this point, I had failed to fit into almost every role: as a daughter, as a wife, as a mother, as an academic.

So my dream of becoming a writer was just like a lump of sadness stuck in my throat.

I got on a plane and went to New York, where the writers were waiting.

Fellow misfits, it's as if your heads are glowing.

I know who it is

This trip to New York is really fun at first

You can choose three famous writers to meet with them, and the organizer will arrange them for you.

You'll be invited to the Gramercy Park Hotel for a late-night scotch with cool, smart, stylish people.

You can pretend that you're cool, smart and stylish

I get to meet dozens of editors, writers and agents for really, really, really fancy lunches and dinners.

how classy? please ask

(audience) How expensive is it?

(Lydia Uknavic) I confess that I stole three table napkins (Laughter) from different restaurants.

I hid the menu in my pants and took it home.

(Laughter) I just wanted to keep something as a memento so that when I get home, I know it wasn't a dream.

hey?

The writers I'd like to meet are Carol Maso, Lynn Tillman, and Peggy Phelan.

She wasn't a famous best-selling author, but to me, she was something of a maestro of women's writing.

Carol Maso wrote a book that is my art bible.

Lynne Tillman made me believe that the stories I write can go out into the world.

Peggy Phelan made me realize that my brain might be more important than my boobs.

They're not mainstream female writers, but they're breaking the mainstream with their body-themed works, like a river running through the middle of the Grand Canyon.

I was so happy that I almost died because now I can spend time with three master female writers in their 50s.

The reason why I was so happy to die was because I had never felt such joy.

I had zero experience in such a space.

mother was a high school graduate

At that point, my writing career was like a sad little stillborn baby.

So my first few days in New York I was happy to death

I was like, "I can die right now! It's too good."

Some of you in the room should be able to understand what's going to happen next.

First Farrar, Strauss and Giroud—

I was taken to a publisher that was a dream come true for me.

After all, it's the publisher of T.S. Eliot and Flannery O'Connor.

The great editor sat me down and kept telling me that inside of you was a book about life as a swimmer.

I could write an autobiography

All the time he was talking, I was smiling and nodding like a numb idiot with my arms crossed on my chest and nothing really came out of my mouth.

Finally got a tap on the shoulder, like a swimming coach.

Then she gave me some books and sent them to the exit, asking me to do my best.

The next place they took me was a publisher called W.W. Norton, where I thought I'd be kicked out just for wearing Dr. Martens boots.

but it was okay

Coming to Norton itself felt like reaching out to the night sky and touching the moon, like my name was painted in the night sky with the stars.

that was a big deal for me

you know

Editor-in-chief, Carol Hooke-Smith, looked into my face with her sharp little eyes and said, "Then send me some manuscript! Now!"

Now, most people, especially people at TED, go straight to the mailbox, right?

It took 10 years for me to put something in an envelope and put a stamp on it.

On my last night in New York, I read to a large audience at the National Reading Club.

At the end of the reading, Catherine Kiddy, a well-known copyright agent, came up to me, held my hand, and offered to represent me on the spot.

I just stood there and it was like I couldn't hear anything

Has anyone experienced this?

And I almost cried, because everyone in the room was so well-dressed, and the only thing that came out of my mouth was, "I don't understand. Let me think about it."

I said okay, and Katherine walked away.

Even though there were so many chances, a mass of sorrow remained stuck in my throat...

This is what often happens to misfits like me.

People who don't know how to hope, how to say yes, or how to seize the big opportunity, even if it's right in front of them.

It's because of the shame we have

It's embarrassing to want happiness

It's embarrassing to feel happy

I was embarrassed because I didn't think it was okay for me to be in the same space as the people I admired.

If I could go back to that time, I want to tell myself

Like the women in their 50s who supported me at that time

I want to teach my back then what I want and how to stand up and say I want what I want.

"You! You over there! There's a place for you here too."

Because light shines on everyone, and people cannot exist without each other.

But at that point, I was on the plane back to Oregon, watching the familiar evergreens and the rain come into view, and I was miserable drinking the little bottle of liquor that the plane brought out.

I thought that if I was a writer, I would be a misfit writer.

I mean, I went back to Oregon with no publishing deal, no agency, and my mind and my heart were filled with just the memory of sitting so close to all the amazing writers I admired.

Memories were the only reward I allowed myself to have.

Even so, in the dark room, even after returning to my underwear, the voices of the writers revived.

"Ignore people who don't listen to your opinion or interfere with what you write."

"Put into words the story that only you know how to tell"

"Sometimes the act of writing can save your life."

Now, as you can see, I'm a woman in her 50s.

I am a writer

is also a mother

also became a teacher

Do you know what kind of students you like?

I got a dreamy letter -- it didn't come true that day, but then I wrote an autobiography called The Chronicles of Water.

It's the story of how you painstakingly remade yourself over and over again as the wreckage of the choices you made.

All I had to do was give words to the story.

Most cultures mythologize chasing dreams.

It's called "A Hero's Journey"

But if I were you, I'd choose a different mythology that's a little more to the side or the bottom.

"Myth of the Misfit"

It's like this — even in those moments when you fail, then you're beautiful

Even if you don't know it yet, you have the power to remake yourself, infinitely

that's your beauty

You can be drunk You can be abusive You can be a criminal You can be homeless

It's okay if you've lost your mind

You can be broken and in the middle of your heartbreak The only reason I'm here is to tell you that you're still so beautiful

Your story deserves to be known You, a rare and extraordinary misfit, you, a new breed of misfit, can tell stories in a way that only you can - because you're the only one in this place...

I am waiting for such a story

thank you

(applause)

An alien monolith has been discovered on planet RH-1729, and scientists around the world are racing to solve its mystery.

Our engineering team has developed an elegant rover for research.

The probe will consist of 27 cubic units and will be able to perform the scientific tests necessary to analyze the monolith.

Units can group themselves into a big 3x3x3 cube, and each unit can be placed anywhere and in any direction inside the big cube.

It can also break apart, turn around, and return to being a cube.

that's your job

A rover needs a special protective coating because it goes through a variety of extreme environments.

The red paint shields the probe from the cold conditions of outer space, the purple protects it from the extreme heat as it enters RH-1729's atmosphere, and the green protects it from thunderstorms on alien planets.

Each side of the 27 cubic units can be painted freely, but only one color can be used per side.

You have to figure out how to color each face so that you can rearrange it into a cube where you can see only the red side, and you can even rearrange it into a purple and a green cube.

How can we paint 27 cubes to travel to planets?

[Stop here if you want to think for yourself.]

First of all, paint all the outer faces of the cube red, because you'll need it anyway.

And then we break it down into 27 cubes and look at the colors.

The 8 corner cubes each have 3 red faces, the 12-sided cube has 2 red faces, the 6-sided cube has 1 red face, and the central cube has no red faces.

At this point, we've painted a total of 54 faces red, which means we'll also need an equal number of green and purple faces.

You end up painting 54 faces red, 54 faces green, and 54 faces purple.

These 162 faces are equal to the sum of the faces of each cube.

So there's no point in wasting it

Whatever the method, it will have a high degree of symmetry.

this idea may help

Focus first on the central cube

It's a good idea to paint half green and half purple, so you can use green and purple cube corners and not waste a single face.

You'll also want a central cube that doesn't have a green side or a purple side.

So take two corner cubes from the red cube and paint the remaining three sides of one cube purple and the other three sides green.

Now there are six cubes with one face painted red.

Each of the other five faces has no color.

Divide these cubes in half

One group of cubes will have three sides green and two sides purple, and the other group will have three sides purple and two sides green.

Swap colors according to symmetry and repeat the same coloring

Then you will have 6 cubes with one green side, 6 cubes with one red side, and 6 cubes with one purple side.

Counting the filled cubes, for each color there are 8 corner cubes, 6 edge cubes, 6 face cubes, and 1 center cube.

So we know we need six more green and purple edges.

Exactly six cubes remain, each with four sides left colorless.

Paint two sides of these cubes green and two sides purple.

So the cube is perfectly painted and makes for a wonderful journey.

It first becomes a red cube in space, then purple as it enters RH-1729's atmosphere, and then green as it passes through a thunderstorm.

When you arrive at the Monolith, you realize you've achieved what humans have long dreamed of: an alien encounter.

In 1919, a little-known German mathematician, Theodor Kaluza, came up with a very bold, in some ways, wild idea.

He said that our universe may actually have more dimensions than the three we all know.

Kaluza defined that in addition to left and right, front and back, and top and bottom, there may be many more dimensions of space that are somehow invisible to us.

It often happens that someone comes up with a bold and crazy idea, and it's bold and crazy, but it doesn't really have anything to do with the real world.

But Kaluza's idea, which I still don't know if it's right or wrong -- at the end of this talk, I'm going to talk about an experiment that might prove right or wrong in a few years -- it had a huge impact on 20th century physics, and it's still informing a lot of the latest research today.

Now let's talk about those extra dimensions.

Where do we start?

First, I need a little background, going back to 1907.

It was the same year that Einstein discovered his special theory of relativity, and he was basking in the pleasant satisfaction of embarking on a new project: trying to fully understand the mighty, pervasive force of gravity.

At the time, a lot of people thought it was all settled.

Newton came up with a theory of gravity in the late 17th century, and it worked well, and it did a good job of describing the motion of the planets, the moon, and so on.

All of this can be expressed using Newton's equations.

But Einstein realized that Newton was leaving something out, and even Newton himself wrote that he could calculate the effects of gravity, but he didn't understand how it actually works.

How in the world does the sun, which is 150 million kilometers away, affect the motion of the Earth?

How on earth does the sun pass through empty inertial space and affect it?

This is what Einstein did to understand how gravity works.

let me show you what he found

Einstein discovered that the medium through which gravity is transmitted is space itself.

Here's an idea: think of space as the basis of everything that exists.

Einstein said that space would be a clean plane if there were no matter

But if there is matter, like the sun, the fabric of space is distorted and curved.

And that's what conveys the force of gravity

Even the Earth bends the space around it

let's see the moon

The idea I've just described is that the moon orbits because it rolls along the curved spatial canyons that the sun, the moon, and the earth each create through their existence.

See the big picture

The Earth maintains its orbit because it rolls along valleys in space curved by the presence of the Sun.

This is a new way of thinking about how gravity works.

This idea was verified by astronomical observations in 1919

It really was, the observations backed up the data.

This gave Einstein worldwide fame.

And Karuza thought

Like Einstein, he was also looking for a so-called "Unified Theory"

A theory that can explain all the forces of nature with one idea, one principle, and one equation.

Kaluza thought that Einstein could explain gravity in terms of the distortions and curvatures of space, or more precisely space-time.

I wondered if I could do the same thing for myself using another known force, and that force was known as the electromagnetic force.

It's the force that causes electricity, the attraction of magnets, and so on.

Kaluza thought that the electromagnetic force could be explained in terms of distortion and bending in the same way as Einstein did.

And that begs the question: what are the distortions and bends?

Einstein already used the warping and bending of space and time to explain gravity.

Nothing else seemed to warp or bend

So Kaluza thought maybe space had more dimensions.

They say that to explain one more power, you need one more dimension.

Kaluza assumed that the world was four-dimensional instead of three-dimensional, and that electromagnetic force was distortion and bending in the fourth dimension.

And if you look at that equation, it's exactly the equation that scientists have been using for years to describe the electromagnetic force.

It's amazing, it just popped up.

When Kaluza realized this, he was so excited that he ran around the house and shouted, "I won!" He said he had found a unified theory.

Clearly, Kaluza was a very theoretical person.

In fact, one story says that when Kaluza was trying to learn to swim, he read an academic paper on swimming (Laughter) and then jumped into the ocean.

He was the kind of man who would bet his life on theory.

But for those of us who are a little more pragmatic, his report immediately raises two questions.

First, if space has more dimensions, where are they?

It seems that no one can see

And two: does this theory really work in detail when applied to the real world?

The first question was answered by Oskar Klein in 1926.

Klein said that there may be two kinds of space. Some dimensions are large and easily visible, while others are so small and rolled up that they are all around us but invisible to our eyes.

Visually speaking this is

Imagine you're looking at something like a cable carrying a signal.

We're in Manhattan, in Central Park -- it doesn't really matter -- from a distance, the cable looks one-dimensional, but we all know it has some thickness.

But it's very difficult to see from a distance.

If you zoom in and put yourself in the shoes of, say, an ant walking around, the ant is so small that it can go into all the dimensions of the cable, not just the long dimension, but also clockwise and counterclockwise.

I hope you understand

It was very difficult to get Ali to do this.

(Laughter) But this confirms that there can be two kinds of dimensions: large and small, and there may be large dimensions all around us that we can easily see, but other dimensions that are coiled up like round pieces of cable, and they are so small that they have remained invisible until now.

let me show you what it's like

If you look at space itself, for example, you can only see two dimensions on the screen.

Maybe someone will fix it one day, but anyway, anything that isn't flat on the screen is a new dimension that gets smaller and smaller until it slips into the subtle depths of space itself. And that's the idea.

But ultra-microscopic ants can roam large dimensions as we know them -- parts of the grid -- so small that they can't be seen by our unaided eyes, and even with the most advanced equipment, they'll be able to roam into tiny, coiled-up dimensions.

It's pushed deep into the substructure of space itself, but as we're seeing, there can be many more dimensions.

This explains why the universe may have more dimensions than we can see.

So what about my second question: does this theory really work when applied to the real world?

Einstein, Kaluza, and many others have elaborated this framework and tried to apply it to the physics of the universe as they understood it in their time, but in the details the theory just didn't work.

For example, they couldn't get the mass of the electron to work correctly with this theory.

So many people worked on it, but I'm sure by the 1940s or '50s, this strange but compelling idea of ​​how to unify the laws of physics was gone.

Until great things happen in our time

There's a new effort being pursued by myself and many other physicists around the world to unify the laws of physics, and it's called superstring theory.

The great thing about superstring theory is that, at first glance, it has nothing to do with the idea of ​​extra dimensions, but when you study it, it brings the idea of ​​extra dimensions back to life in a whole new way.

let me tell you why

What is superstring theory?

It is a theory that attempts to answer this question: What are the underlying, invisible and indivisible building blocks that make up everything in the world around us?

this is what i think

Think of something familiar, like a candle in a candlestick, and you want to find out what it's made of.

Go deep inside the object and examine its components

If you go very deep, you know, there are atoms

You also know that it doesn't end with the atom.

An atom consists of a nucleus made up of neutrons and protons and electrons clustered around it.

Even neutrons and protons have smaller particles in them called quarks.

Traditionally, this was the end

This is the new way of thinking about string theory.

Deep inside these particles is something else

It's a dancing fiber of energy like this

It looks like a vibrating string, hence the name string theory.

A vibrating string can vibrate in different patterns, as you can see in a cello, but the same can be said for an energy string.

does not produce different pitches

It creates the different particles that make up this world.

If this idea is correct, the hyperfine view of the universe would look like this.

The universe is made up of vast numbers of tiny vibrating fibers of energy vibrating at different frequencies.

Different frequencies produce different particles

Those different particles make up the diversity of this world.

There is unity here, because matter particles, electrons and quarks, radiation particles, photons, gravitons will all be made up of one entity.

All of nature's matter and forces are assembled under the direction of a vibrating string.

That's what a unified theory means

There are also problems

When you study string theory mathematics, you realize that it doesn't work well in a universe with three dimensions.

4D, 5D, 6D Doesn't Work

Only in a universe with 10 dimensions of space and 1 dimension of time can we solve the equation and show that it holds.

This brings us back to Kaluza and Klein's idea that the world has more dimensions than we can see if it's properly portrayed.

With this in mind, you might think, okay, okay, if there are extra dimensions and they're really tightly rolled up, they're probably too small to see.

But if there's a subtle civilization of green people and it's too small to see

For string theory to predict -- no, it doesn't. String theory doesn't predict that.

(Laughter) But it begs the question: Are we just trying to hide these extra dimensions, or do they tell us something about the world?

For the rest of the time, I would like to talk about two features of extra dimensions

First, many of us think that these extra dimensions probably hold answers to some of the deepest questions of theoretical physics and theoretical science.

The question is this: If you look around the world, as scientists have been doing for the last 100 years, there seem to be 20 or so numbers that represent our world.

Numbers like the mass of particles like electrons and quarks, the strength of gravity, the strength of electromagnetic forces, and so on. These 20 or so numbers have been measured with incredible precision, but no one can explain why they have particular values.

Can string theory answer the question?

still not possible now

But we think the answer to why those numbers have the values ​​they have might have to do with the shape of the extra dimensions.

The amazing thing is that if those numbers were different from what we know, the universe as we know it wouldn't exist.

this is a deep question

Why are those numbers so finely tuned so that stars can shine and planets can form?

Can we explain those 20 numbers?

String theory suggests that those 20 numbers have something to do with extra dimensions.

let me show you how

When we talk about extra dimensions in string theory, it's not just one extra dimension as Kaluza and Klein thought.

This is the concept of extra dimensions in string theory.

Higher dimensions are closely related

This is an example of what is known as a Calabi Yao manifold The name doesn't matter

But as you can see, the extra dimensions are convoluted on themselves and related to each other in very interesting ways, interesting structures.

If extra dimensions looked like this, this is what the microscopic landscape of the universe around us would look like at the tiniest scale.

When you wave your hand, you're moving between these extra dimensions over and over again, but they're so small that you don't notice them.

So what are the physical implications associated with the number 20?

Look at this, if you look at a French horn, you should see that the vibrations of the airflow are influenced by the shape of the instrument.

In string theory, all numbers are reflections of the modalities in which the string can vibrate.

So just as air currents are affected by the twisting and spinning of an instrument, the string itself will be affected by the vibrational patterns of the environment in which it moves.

let the string appear

If these little strings are vibrating -- they'll show up soon -- you can see that there's an extra-dimensional geometry that influences the vibration of the strings.

If we could know exactly what the higher dimensions looked like - not yet, but if we did - we would be able to calculate the sounds, or vibrational patterns, that could be produced.

And if you can calculate the possible vibration patterns, you should be able to calculate the number 20 I was talking about.

If the answers we get from those calculations match those numerical values ​​obtained through detailed and precise experiments, it will in many ways be the first fundamental explanation for why the universe is structured the way it is.

The second last question I want to talk about is this: How can we more directly examine these extra dimensions?

Is this just an interesting mathematical construct that might explain some hitherto unexplained features about the world, or can we actually test the extra dimensions?

This is really exciting, but maybe in five years or so we'll be able to test the existence of these extra dimensions.

I mean, at CERN in Geneva, Switzerland, they're building a machine called the Large Hadron Collider.

It's a machine that sends particles into a tunnel in opposite directions at near-light speed.

Often those particles will be aimed at each other, so a head-on collision will occur.

The hope is that if the collision produces enough energy, we might be able to push some of the debris out of our dimension and into another dimension.

How can we know that?

We measure the amount of energy after the collision and compare it to the amount of energy before the collision, and if there's less energy after the collision, that's proof that the energy has flowed out.

If the outflow follows the correct pattern that we can calculate, this will prove the existence of extra dimensions.

Let me show you this idea visually

Think of a particle called a graviton. We suspect that if extra dimensions were real, this would be the debris that would be extruded.

The experiment is done like this

Take these gravitons and hit them hard

If we're right, some of the energy from that collision will fly into shards into the extra dimension.

We're going to do these experiments in the next five, seven, 10 years or so.

If this experiment bears fruit, and if we can tell that a particle of that kind was extruded by having less energy in our dimension than it originally was, then it would indicate the existence of an extra dimension.

For me, this is a really remarkable story and a huge opportunity.

Einstein came along and said that space-time can bend and bend, and that's gravity.

And now string theory says that gravity, quantum mechanics, and electromagnetic force all come from the same place, if only the universe had more dimensions than we can see.

Here's an experiment that might validate it in our lifetime

has tremendous potential

Thank you very much

(applause)

Historical sources tell us how the ancient Greeks dressed, how they lived, how they fought.

But what about thoughts?

One reasonable interpretation is that the ability to imagine, to be self-conscious, to dream, at the root of human thought, has always been the same.

Another possibility is that the social transformations that have shaped our culture have also altered the structure of human thought.

There are many different opinions on this matter.

In fact, this has long been the subject of philosophical debate.

Is this question part of science?

What I'm suggesting here is that just as we can recreate what an ancient Greek city looked like from just a few bricks, so the writings of a culture can serve as archaeological material and fossils of human thought.

In fact, psychologist Julian Jaynes did some sort of psychological analysis of some of the oldest books of mankind, and in the 1970s, he came up with a very bizarre and radical hypothesis: just three thousand years ago, humans were, as we would call them today, schizophrenic.

The rationale for this claim is that the ancient humans in these books consistently heard and acted upon, regardless of their cultural and geographic differences, and thought of it as the voice of God and the whispering of the Muses.

modern day we would call this a hallucination

And then, as time went on, the ancients began to realize that they were the creators and owners of their inner voice.

This gave us the ability to introspect, to think about our own thoughts.

According to Jaynes' theory, it was a fairly recent cultural shift that humans began to embrace self-consciousness, at least in the way we know it today, to feel that they are the pilots of their own existence.

This theory is pretty spectacular, but it has an obvious problem: it's based on a very small number of very specific cases.

Can this theory's claim that human introspection was established only 3,000 years ago be tested quantitatively and objectively?

The problem with handling this question is obvious.

It would be funny if Plato woke up one day and said, "Hi, I'm Plato."

(Laughter) And actually, this tells us the heart of the matter.

We have to find the emergence of the concept before it is verbalized.

The word introspection itself never appears in the books we want to analyze.

So our solution is to build a lexical space.

This huge space contains all kinds of words, and if you pick any two words, the distance between them shows how related they are.

For example, the words "dog" and "cat" should be very close, but "grapefruit" and "logarithm" should be very far apart.

We have to create a lexical space where this applies to any two words.

There are several ways to construct a vocabulary space.

One way is to just ask the experts, kind of like building a dictionary.

Another option is to follow a simple assumption: if two words are related, they tend to appear in the same sentence, in the same paragraph, in the same document, more often than just by chance.

And by taking this simple hypothesis, this simple method, and using a computational method that reflects the fact that our lexical space is so complex and highly dimensional, we've had some pretty good results.

To give you a sense of how effective it is, let me show you the results of an analysis of familiar words.

As you can see, these words automatically split into semantic neighborhood groups.

Fruits, body parts, computer components, scientific terms, etc.

The algorithm also understands conceptual hierarchies.

For example, these scientific terms are divided into two subcategories: astronomical terms and physical terms.

It also has very sophisticated features.

The word astronomy, for example, seems to be in a bit of an odd position, but it's actually in exactly the right place, between the word science, which refers to itself, and the astronomical terminology it describes.

There are any number of such examples

In fact, if you stare at this for a while, you'll find that just picking out random trajectories of words can make you feel like you're making a poem.

Because in some ways, exploring this space is like exploring the mind.

And last but not least, the algorithm also identifies what intuition is. If you follow the vocabulary associated with intuition, it should bring you closer to introspection.

For example, words like "self," "guilt," "reason," and "feelings" are very close to introspection, while "red," "football," "candles," and "bananas" are very far away.

By building a lexical space, questions about the history of introspection, questions about the history of all concepts that were previously abstract and vaguely elusive, become concrete enough to be addressed by quantitative science.

We can simply take the books we are interested in, digitize them, project the stream of words in the form of a single trajectory into our lexical space, and ask whether that trajectory revolves around the concept of introspection over a significantly longer period of time.

And in this way, we were able to analyze the history of introspection in ancient Greek lore, because the written sources are the most abundant.

Specifically, I arranged the books I wanted to analyze in chronological order, extracted all the words in each book, projected them onto the lexical space, asked how close each word was to introspection, and averaged the results.

And then I looked to see if the content of these books gradually moved closer and closer to the concept of introspection as the times changed.

So this is exactly what happened in ancient Greek lore.

In the era of Homer's lore, there was little increase in the number of books approaching introspection.

But around the 4th century BC, this trend began to increase exponentially, nearly quintupling, indicating that writings were moving ever closer and closer to the concept of introspection.

One of the nice things about this finding is that it allows us to further explore whether the same trends apply to other independent traditions.

When I ran the same analysis on Judeo-Christian traditions, the results were pretty much the same pattern.

Again, a slow upward trend in the oldest Old Testament, followed by a sharp rise in the later New Testament.

And the peak closest to introspection is the Confessions of St. Augustine, written around the fourth century AD.

This is very important, because St. Augustine has been regarded by scholars, philologists and historians as one of the founding fathers of introspection.

Some people even consider him the father of modern psychology.

Our algorithm has the strengths of being quantitative, objective, and of course, extremely fast and instantaneous, but it also brings some very important conclusions to this long-established quest.

And this is one of the beauties of science, but now we can apply this idea, generalize it, and apply it to many different fields.

If we ask ourselves the same questions about the past of human consciousness as we do, perhaps the hardest question is, does this research tell us about the future of our consciousness? the question is

Or, more precisely, whether the words we speak today will tell us what our state of mind will be in a few days, months, or years.

Just as many modern people wear various sensors to monitor their heart rate, respiration, and genes, and hope that this will help prevent disease, it is possible to ask whether monitoring and analysis of the words we speak and the written words of Twitter and e-mail can predict mental changes.

I set out to tackle this challenge with my research colleague, Guillermo Setch, who I've worked closely with for some time.

We analyzed recorded speech from 34 young people at high risk of developing schizophrenia.

First, we evaluated the utterances with an algorithm to see if we could make a prediction based on their characteristics: whether they would develop a mental illness within a grace period of just under three years.

But contrary to hope, the result was failure after failure.

Because we didn't have enough information to analyze the semantics of words, we couldn't predict future mental structures.

It was still good enough to discriminate between a group of schizophrenic patients and a control group, similar to the results obtained when analyzing ancient manuscripts, but not enough to predict the onset of future mental illness.

But then I realized that what matters most is not what a person says, but how they say it.

More specifically, it doesn't matter where a word is semantically, but how far and how fast it moves from place to place.

The metric I've come up with here is what I call semantic coherence, and it's basically the degree to which an utterance stays within a single topic, a single category in terms of meaning.

So, for those 34 young people, we found that the semantic consistency algorithm was 100 percent accurate in predicting the onset of mental illness.

Such a result had never been achieved, or even approached, by any other clinical method.

I remember it vividly, but one time I was working on this assignment, and I was sitting at my computer when I saw a tweet from a student named Polo, the first student I taught in Buenos Aires, and by this time living in New York.

I was kind of curious about his tweet, and it wasn't clearly expressed in words, so I wasn't sure what the problem was, but I had a strong intuition, like a strong bug alert, that something was wrong.

So I called Polo, and he was actually feeling sick.

This simple fact, the fact that by reading between the lines, I could see the feelings behind the words, and that simple fact helped him tremendously.

So what I want to share with you today is that we're close to understanding how to translate this intuition into an algorithm, that we all have intuitions that we all have in common, that we can turn into algorithms.

And then there may be a very different form of mental health, where objective, quantitative, automated analysis is about the words we write and the words we say.

thank you

(applause)

Between the chest and the abdomen, there is one of the most important muscles, which you may not know is the lower esophageal sphincter (LES).

This ring-shaped tissue is important when we eat normally.

When this LES doesn't work properly, you get heartburn, a burning, sour feeling in your chest that many people experience at least once in their lives.

Humans have battled heartburn for hundreds, if not thousands of years.

It's been on the rise, especially recently, and it's become a common subjective gastric symptom around the world.

If heartburn symptoms appear to be frequent and severe -- more than twice a week -- it's called gastroesophageal reflux disease (GERD).

So what is the cause? How can I prevent it?

Heartburn begins at the gastroesophageal junction, where the LES is located.

The smooth muscle ring of the LES is regulated by complex nerve roots that also connect to the brain, heart, and lungs.

After food enters the stomach through the esophagus, the muscle's job is to prevent reflux.

The LES contracts to squeeze the opening of the stomach and apply high pressure to prevent acid from leaking out.

However, if the LES relaxes at the wrong time or weakens over time, it becomes an ill-fitting lid and the pressure drops.

Then the burning stomach acid and the food itself rises up into the esophagus and sometimes even into the mouth.

The cause of this internal drama has long been attributed to diet.

Things like caffeine and mint can have a relaxing effect on the LES, which prevents it from working properly.

Also, acidic foods, like citrus fruits and tomatoes, may exacerbate esophageal irritation because they exude stomach acid.

So do carbonated drinks, which can bubble in the stomach and force the valve open.

But research has shown that food isn't the only culprit.

Smoking is also a risk factor because nicotine relaxes the LES.

Large amounts of alcohol can also cause the same result.

Pregnant women often experience heartburn because the fetus puts pressure on the stomach.

It could also be due to certain hormones.

Obesity can also cause hernias and interfere with the mechanisms at the gastroesophageal junction that normally prevent heartburn from refluxing.

Many medications, such as asthma medications, high blood pressure medications, birth control pills, and antidepressants, also have adverse side effects on LES.

If heartburn only happens occasionally, don't worry.

But if it happens regularly, it will gradually weaken the LES and leak more stomach acid.

The problem may get worse if left untreated

Over time, acid leaks form scar tissue that narrows the esophagus, making it difficult to swallow food.

Continued acid reflux damages the lining of the esophagus, leading to a rare condition called Barrett's esophagus, which can lead to esophageal cancer.

Luckily, most heartburn is treatable, using drugs to reduce or neutralize stomach acid.

Even in extreme cases, surgery can be done to tighten the LES and reduce symptoms.

On the other hand, it can also prevent heartburn.

Avoiding certain foods Quitting smoking and maintaining a healthy weight alone can dramatically reduce reflux

If you're careful, you can keep your LES and your stomach healthy, and you can avoid heartburn.

My mission is to communicate the urgency of climate change through my work.

We've traveled north to the North Pole to capture the reality of polar ice melting, and south to the equator to document sea level rise from there.

Only recently did I visit the Greenland ice sheet and the low-lying island of the Maldives.

My work seeks moments of landscape transition, wildness, and stillness, and provides a psychological connection to the spaces depicted for people who may never have the opportunity to visit the place.

Instead of tragic scenes, I chose to paint beauty.

This is because I thought that if you just experience the solemn scenery, you will have the opportunity to want to protect it.

Behavioral psychology also points out that we base our choices and actions on emotions above all else.

And a number of studies show that art is more effective at evoking emotions than disturbing news.

Experts predict an ice-free Arctic summer as early as 2020.

And sea level rise could range from 0.60 to 3 meters by the end of this century.

In light of these predictions, I've devoted my life to making sense in a more accessible way that numbers can't convey.

The whole process begins with a visit to the frontlines of climate change.

Take thousands of photos on the spot

After returning to the studio, I work on large-scale works, sometimes over three meters wide, relying on memories, experiences, and photographs.

Paint with soft, colorful pastels that dry like charcoal.

I think of myself as a drawing, but some people call it a painting.

"Finger painter." I'm confused when you say that.

(Laughter) But it's true that I don't use any tools, and I always use my fingers and my palm to apply pigment to paper.

Painting is a kind of meditation for me.

calms me down

I don't perceive what I draw as ice or water or anything like that.

Instead, strip the image down to its essential colors and shapes as much as possible.

Once the work is completed, you can finally experience an iceberg floating on the surface of clear water, or an undulating wave with splashes, as an overall composition.

On average, it takes about 10 seconds to complete a piece of this size, as you can see.

(Laughter) (Applause) In fact, it takes about 200 or 250 hours at this size.

Since the day I picked up a crayon, I've been drawing

My mother was an artist, so I grew up surrounded by art supplies around the house.

My mother's passion for photography drove her to the farthest reaches of the earth, and our family was fortunate enough to join her in that adventure and help her.

I've ridden camels in North Africa and dog sleds near the North Pole.

In August 2012, I led my first expedition to the northwest coast of Greenland with a group of artists and scholars.

My mother was originally going to lead the journey.

In the early stages of planning, I was supposed to be with you on this journey, until my mother succumbed to a brain tumor—

The cancer quickly took its toll on her body and mind, and she died six months later.

While lying in bed, I vowed to fulfill my mother's last wish, unwavering in her passion to explore.

My mother's passion for the North Pole touched my heart many times in Greenland, and at that time, I felt the grandeur and ephemerality of the scenery that unfolded there.

A real iceberg, I can't tell you how big it is

The raw thump and roar of the ice sheet was far from what I expected.

I enlarged the size of the work to convey the awe that stood in front of me.

Of course, the magnificence of the ice mass is depicted, but at the same time, its fragility is also depicted.

From our ship we can see ice blocks sweating in the warm, unseasonable sunlight.

In Greenland, I've visited many Inuit communities, and they're facing serious challenges.

They say that much of what was once sea ice is no longer visible.

Without ice, their hunting and gathering lands would be devastated, threatening their way of life and even survival.

Greenland's melting glaciers have been identified as one of the main causes of rising sea levels, and are beginning to flood some of the planet's low-lying islands.

The year after finishing my trip in Greenland, I visited the Maldives, the lowest country in the world.

During my stay, I had a scene and an inspiration that would form the basis of my next work: waves crashing on the shores of a country whose entire land may sink within this century.

Tragic events happen somewhere every day, whether global or personal.

My mother's ashes were scattered on the melting ice of Greenland.

Even if it continues to flow and change, it remains part of the scenery she loved so much.

One of the many lessons my mother taught me is to be optimistic rather than pessimistic.

My paintings celebrate the beauty of what we are losing now.

It is my hope that by recording the magnificent scenery that sways in the changing times, it will serve as an impetus for people around the world to take action for the future.

thank you

(applause)

What do you see?

Are you a barber? I see an opportunity. An opportunity for good health.

For black men, the barber is more than just a place to get a haircut and a beard.

there are far more than those

Historically, barbershops have been safe havens for black men.

We come there in search of friendship, unity and healing.

It's also a place to take a break from the stresses of work and sometimes family life.

There, you don't have to worry about how others see you.

I'm not afraid of others, I'm not intimidating anyone

A place of loyalty and trust

So the barbershop is a precious place for us, where we can just be ourselves and just have a chat without any worries.

Chatting, small talk, conversation is the essence of a black barber shop.

When I was a kid, my father used to take me to the barber shop.

I used to go to Mike's barber every other Saturday.

Every time I went to a barber shop, I met the same people, waiting for their favorite barber, or just soaking up the atmosphere.

And I still remember being warmly welcomed with cheerful greetings every time I went.

The father who is called out to "Hi Leb"

He was a local pastor and was treated like a celebrity.

"Hey young man, how are you?"

It made me feel very special

The conversation there covers all sorts of things

Politics, sports, music, national and international news, and local rumors were also discussed.

about women and being black in America

and mostly about health,

Health conversations were deep and long-lasting.

We would often discuss the advice our doctors gave us: "Lose your salt intake," "Don't eat fried foods," "Don't smoke," "Reduce your stress," etc.

He talked about all sorts of ways to deal with stress, like sorting out relationships (Laughter), and all sorts of ways to treat high blood pressure.

In barbershops, people talked a lot about high blood pressure.

40% of black men have high blood pressure

So black men almost always either have high blood pressure or know a black man with high blood pressure.

Sometimes our conversations in the barbershop also extended to what happens if you don't take good care of your high blood pressure.

"Hey, did you hear about Jimmy? He said he had a stroke."

"Do you know Eddie? He passed away last week.

Had a bad heart attack

Even though I'm only 50."

Hypertension is the leading cause of death among black men, even though medical science has shown for decades that death from hypertension can be prevented with early detection and proper treatment.

Why is high blood pressure such a lethal threat to black men?

Black men are more likely to have untreated or undertreated high blood pressure, partly because they don't have as many primary care physicians.

Black men, especially those with high blood pressure, are less likely than others to have a family doctor.

I wonder why?

Early studies of black men's health showed that many people's perceptions of hospitals were one of fear, mistrust, disdain, needless discomfort.

A hospital is just a place to go when you're sick.

If you go, go, wait a few hours, and then you'll be passed around and judged by a person in a white coat who doesn't change his complexion.

So it's no surprise that some people don't want to bother going to the doctor, especially if they feel fine.

but here's the problem

Even if you think you're doing well, your high blood pressure can erode vital organs.

This is Denny Moe, I'm Denny Moe's barber in Harlem.

I've been fortunate enough to have Denny cut my hair for the past eight years.

Denny once said, "Hey doctor, a lot of black men trust barbers more than doctors."

I was very surprised at first, but when you think about it, it makes sense.

The average length of time black men go to the same barber is about eight years, the same as Denny and I have been together.

And black men go to the barber every two weeks.

You don't just trust your barber to take charge of your appearance and style, but you also entrust your secrets and even your life to him.

Like many barbers, Denny is more than just an artist, businessman, and friend.

He is a community health leader and passionate activist.

The first time I went to Denny Moe's barber, he didn't just cut his hair.

He was asking everyone to vote, trying to get the audience and the community to speak up.

Because of this activism and the community investment that black barbers represent, barbershops are, of course, the perfect place to talk about high blood pressure and other health issues in the community.

First, barbershops aren't medical facilities, so there's no negative psychological burden.

The barbershop is a place you know very well, surrounded by friends who listen to your stories, your struggles and your health risks.

Second, the barbershop is a place of connection, loyalty and trust, where we can talk more openly about health, especially high blood pressure.

So the high blood pressure story has all the ingredients for a store story: stress and high blood pressure, food and high blood pressure, relationships and high blood pressure, and black life in America and high blood pressure.

But in the barber shop, we don't just talk about high blood pressure.

concrete action can be taken

We can partner with Denny Moe barbers around the world to help communities address health inequalities as unique challenges.

In the 1960s and '70s, when screening for high blood pressure spread from private clinics and hospitals to the community, black doctors like Dr. Eli Sanders of Baltimore and Dr. Keith Ferdinand of New Orleans spearheaded health promotion campaigns for people in black urban neighborhoods.

These pioneers paved the way for me on my own professional journey into barbering and health, starting at medical school in Chicago.

My very first research project was when I was a medical student, and it was about helping to make treatment systems more attractive to black people.

In 12 focus groups with a wide range of black men, I taught them that being healthy isn't just about feeling healthy, but that being healthy is deeply connected to feeling healthy and looking healthy.

This research led to the establishment of a community clinic called Project Brotherhood, led by Dr. Eric Whitaker, to provide better health care for black men.

Some of this black care included free haircuts on the spot for anyone who came in to get the care they needed. This was to show that we care not just about health, but how we look, and what's important to them is important to us.

There's only one Project Brotherhood, but there are thousands of Black barbershops where you can combine health and haircuts.

I then headed to Dallas, Texas, and what I discovered was that barbers were not only motivated, but they could actually sweat and participate in providing much-needed health services and improving the health of their customers and communities.

I teamed up with a great fellow black barber to teach me how to measure my blood pressure, how to counsel, and how to see a doctor to manage my high blood pressure.

The barber was not only motivated, but also very skilled.

In just over three years, the barbers have taken thousands of blood pressure checks and have referred hundreds of black men to doctors for high blood pressure treatment.

This barber-physician collaboration increased the number of people achieving target blood pressure levels by 20 percent and, on average, reduced participants' blood pressure by about 3 percentage points.

If this three-point reduction could be achieved for all black men with high blood pressure in America, it would prevent 800 heart attacks, 500 strokes and 900 deaths from hypertension in just one year.

The barber experience is no different in New York City, where I'm currently working.

With an incredible team of diverse research assistants, community health workers and volunteers, we've been able to reach more than 7,000 older black men in over 200 barbershops and other trusted community facilities.

And we provided each of them with high blood pressure screening and counseling.

Thanks to Danny Mow and many other barbers and community leaders who, together, believed in their own power and the opportunity to change their communities, we were able to not only lower blood pressure in our participants, but positively impact other health indicators.

Now what do you see?

What is your barbershop?

Where is that place where people with the same problem can find the right solution for you?

there should be an opportunity

thank you

(applause)

I was a Marine with the 81st Platoon, 1st Battalion, Weapons Company, 1st Marine Regiment, Camp Pendleton, California.

let's go!

Audience: Let's go!

(Laughter) I joined the military a few months after 9/11, filled with patriotism and vengeance that most Americans felt at the time, and a strong desire to do something, coupled with the fact that I couldn't do anything.

At the time, I was 17 years old, had just graduated from high school over the summer, and was living in a paying rent in the back room of my parents' house in the small town of Mishawaka in North Indiana where I grew up.

(Laughter) Mishawaka has a lot to offer, but it's not a cultural center.

(Laughter) I was really serious about acting, and in my senior year of high school, I auditioned for the Juilliard School, but I didn't pass.

I've also tried "Go to LA," which is a story I've heard a lot about actors taking about seven dollars, moving to LA, finding a job, and succeeding.

My car broke down on the way to Amarillo, Texas.

After spending all my money on repairs, I finally made it to Santa Monica. I couldn't even get close to LA. I stayed for 48 hours, just walked the beach and drove home.

Parents' house, rent Vacuum cleaner sales

Telemarketing Lawn mowing at local 4-H club fairgrounds

This was my life up until September 2001.

So after 9/11, I felt an overwhelming sense of duty, and I was just angry at everything.It was at myself, at my parents, at the government.

One of the things I'm most proud of in my life

Shooting weapons was cool, driving expensive military vehicles and blowing them up felt good.

But what I loved most about the Marine Corps was what I hadn't thought of when I joined -- the people who were there -- the quirky ones -- a bunch of people with different personalities who were like microcosms of America.

As time went on, all the political and personal bravado that led me to the military fell away, and the Marines came to mean friends to me.

Then, a few years after enlisting, and months before I deployed to Iraq, I had a mountain bike accident that dislocated my sternum and left the unit for treatment.

If you've never been in the military, it's hard to understand, but I was devastated when they told me they weren't going to Iraq or Afghanistan.

I vividly remember being carried out of the military hospital on a stretcher, and the entire squad waiting to make sure I was okay.

Suddenly I'm back to being a civilian again

I knew I wanted to try acting again, and the reason, again, was me, because I thought all the problems in society were trivial compared to the military.

Because can you really complain about the status quo?

"It's hot

Somebody should turn on the air conditioner."

"The line to buy coffee is too long."

I was a Marine, I knew how to survive.

I wanted to be an actor in New York.

If it didn't work out, I would have settled down in Central Park and been rummaging through trash cans behind the bakery.

(Laughter) I reapplied for the Juilliard School, and this time I was lucky enough to pass.

What surprised me was how difficult it was to go from military to civilian.

I was relatively healthy, so I can't even imagine becoming a civilian with scars, both physically and mentally.

But it was hard anyway

One of the reasons is that I was in drama school, and the one thing that I didn't think was justifiable was going to vocal and speaking classes and practicing throwing an imaginary chi out of the back of the room, and practicing giving birth to myself in acting classes.

And partly because I didn't know how to apply what I learned in the military to a civilian environment.

It's both realistic and emotional.

I actually had to get a job

I was an infantryman in the Marine Corps, and I used to shoot machine guns and mortars.

There aren't many places in the general public where these technologies can be used.

(Laughter) Emotionally, I struggled to find meaning.

Everything made sense in the military

Some were rooted in tradition, some had a practical purpose, and they all had meaning.

You can't smoke on the battlefield, so the enemy doesn't know where you are.

The reason I don't touch my face is to maintain my health and hygiene.

When you raise the flag, you turn your face like this to show respect to your comrades who marched before you.

There is meaning in walking and talking like this

Military uniforms are arranged to every corner

I know how faithful you are to these disciplines and what kind of Marine you are.

Your rank in the military represented your background and the prestige you earned.

There are no classes in society

I felt like I had to prove my worth over and over again, just as a human being here.

The respect I received from civilians when I was in uniform disappeared with my retirement.

There is a sense of solidarity

I felt like I didn't, but I felt this sense of solidarity in the military.

How often do you find yourself in a life-or-death situation with your best friend in the general public, and your friend constantly reminds you that he or she won't abandon you?

On the other hand, at drama school

(Laughter) For the very first time, I found a writer, a character, a play that had nothing to do with the military, but that somehow represented the experience of the military, something that I had never been able to express before.

And I found myself becoming less aggressive, because for the first time, I was able to put my feelings into words, and I found it to be a very useful tool.

When I look back on my time in the military, the first thing that comes to my mind is not the cookie-cutter training, the discipline, the hardships. Rather, I think about the intimate relationships and the fun I had.

I've seen my friends struggle with situations like that, and I've been through situations that make them and I feel insecure, but we can't express those feelings.

The military and the theater world are actually very similar.

As a team, we try to achieve bigger goals than we can do alone. It's not an individual problem.

You have your role and you need to understand your role within the team.

Every team has a leader, a commander, and sometimes they do great things, sometimes they don't.

You're forced to become intimate with strangers in a short amount of time, which requires self-control and self-control.

I thought it would be great if I could create a space that brings together two seemingly disparate groups, the military and the civilian population, that entertains people and that, from the point of view of their profession, is a little more thought-provoking than the typical forced fun event. If you get it right, you can go on a date. You can walk the parade deck with a married, pregnant cheerleader. (Laughter) I have no animosity towards cheerleaders.

The bottom line is, how wonderful it would be if we could stage a play through a non-condescending and accessible character.

So I founded a non-profit called AITAF (Arts for the Military), and what I tried to do was try to connect these two seemingly dissimilar groups.

I choose either theater or one-man theater from contemporary American theater. Just like the military audience, it's a play that's diverse in age and ethnicity. It's built with great actors who've been well trained on stage, and it's got a great production.

It's powerful, it's being in a confined space with a complete stranger, and it's a reminder of our own humanity. Self-expression is as valuable a tool as a rifle on your shoulder.

An organization like the military that prides itself on putting one acronym in another acronym can be at a loss when it comes to talking about collective experiences.

When it comes to finding new ways to express yourself, I can't think of a better group than a group of people trying to defend their country.

We've traveled all over the country and around the world, from the Walter Reed Army Medical Center in Bethesda, Maryland, to Camp Pendleton, Kuwait, to Camp Arifjan in Kuwait, to the small and large Broadway theaters in New York.

The actors in the cast became the carriers of the culture, and they had the opportunity to be seen by the public.

Exactly the same for soldiers

I've been doing this for the past six years, and I'm always reminded that there are many facets to acting.

Theater is a craft, it's a political act, it's a business, it can be anything that fits you.

But it's also a service industry.

There's a little more to say, and if I can serve this great service industry -- and that means the military to me -- there's nothing better than that.

thank you very much

(Applause) We're presenting Marco Ramirez's work, "I am not Batman."

Jesse Perez, an amazing actor and a good friend of mine, will be reading, along with Matt Johnson, whom I just met a few hours ago.

It's their first time working together. Anyway, let's see.

Jesse Perez and Matt Johnson.

(Applause) Jesse Perez: At midnight, the sky glows like crazy, a radioactive red.

Squint your eyes and you'll probably see the moon Through the thick smoke of cigarettes and the fumes of airplanes It's like a mosquito net that covers the whole town and keeps out the angels.

(Drums) Look up and you'll see me standing on the edge of an 87-story building

There's a gargoyle and a broken clock tower It's been standing still for maybe a hundred years And that's me

(Drums sound) I'm the fucking Batman

(Drum sounds) Batmobile and Batrang Batcave so real

All you need is a cleaning kit, a back room, or a fire escape. Danny's old jeans are gone.

A navy blue polo shirt It kind of looks good on me but it has a hole in the butt area Because I hooked it to the chain link fence on the back of the Arturo But it's not a big deal because the hem goes into my pants so that's okay That polo shirt is gone too!

I've been transformed

(Drums) No one takes off his belt and whips Batman when he talks back

(Sound of drums) Even if you don't answer

No one calls Batman plain, stupid, skinny

No one fired Batman's brother from Eastern Taxi because they didn't even take a pay cut.

All you get is respect

It's not scary and respectful, it's just respect out of respect.

(Laughter) No one's afraid

Because Batman doesn't demean or hurt anyone.

(Drum sounds) Never (Drum sounds 2) Batman all really want to help people Maybe one day they'll pay grandma's bills And die without regrets

Maybe, well, I'll be really, really, really famous.

(Laughter) Oh, and then beat the Joker.

(Drums pounding) Tonight I'm all alone like every other night

Like an eagle staring and waiting Or no, like an eagle

(Laughter) My cloak flutters in the wind because it's so long I've got pointy ears I've got that mask that covers half my face And I've got bulletproof armor on my chest so no one can hurt me

nobody nobody! Batman and

don't break justice

(Drums) (Laughter) I can hear everything from here.

(Silence) Somewhere in town, an old woman picks up a discarded styrofoam from a trash can and eats someone's spitting sesame chicken.

Somewhere there's a doctor with bad hair and a black lab coat trying to find a cure for a disease that will one day really wipe out humans.

And then somewhere there's a man in janitor's clothes Staggering home drunk after spending half his salary on a 1.2-liter bottle of twist-cap beer and the other half for a four-hour visit to her house, which is on a street where all the streetlights have been shot out, in the darkness of this town, these guys do it casually.

Half a block away from the janitor man there was a bunch of rude assholes waiting for the janitor man with a rusty bicycle chain and a copy of a brand name bat If they didn't take a penny from him they wouldn't, but they would beat him until their arms were so hot they had no teeth to break.

But they didn't expect me to show up

I don't expect the Dark Knight to come A Dark Knight full of branded macaroni and cheese and chopped Viennese sausages from the grocery store

(Laughter) I'd rather they think I don't exist.

I'm on the 87th floor I can hear the asshole saying "Give me the money!"

I saw the janitor turn pale, muttering something in drunken words On the 87th floor, I heard him vomiting in his Dickies

So I swoop down, damn fast I'm like the darkness

I threw a batlang at one of the bare bulbs

(Sound of cymbals) They're all like, "Whoa!

Who turned the lights off? ”

(Laughter) "Who's over there?" "What?"

"Old man, if you know anything, tell me!"

"Did you hear that?"

"What? I can't hear anything. It's true. There's no Batman!"

but then

One of the three bastards gets punched in the head Bokka!

The second hits the black cloak in front of me blindly, but before his fist hits me, I grab the lid of the trash can and hit him in the stomach.

The first one came back and jumped and kicked me, but I know how to do judo and karate, so it's like this (Drum sound) One more time!

(Drums) (Laughter) (Drums) But before I could do any more damage, I suddenly heard a "clack" sound.

And suddenly there was silence all around

A bastard stood there Holding a pistol and aiming straight up It's like he's holding Jesus hostage It's like he's threatening to punch a hole in the moon

I got punched in the head and tried to jump kick me The bastard got hit in the stomach The other bastard also quickly backed away from the black figure in front of me

And the drunk janitor man Kneeled in the corner Praying to St. Anthony 'Cause that's all he remembered

(Drums 2) And there I am, my eyes glowing white, my shoulder gown swaying in the wind.

(Sound of drums) Bulletproof chest rippling Heart beats Morse code through it

And the bastard who was standing there with a pistol Yes he laughed

and he dropped his weapon

Set your sights on me and gave the moon grace

He used my two pointed ears as goalposts and aimed between them as if he were a member of the Special Assault Force.

The man in charge continued to pray to St. Anthony, but his prayers did not reach him.

I had a hunch for a moment

maybe i lose

There is no reason!

(Sound of drums) Shoot! Shoot! Yah!

"Don't kill me!"

Baki! I broke my wrist! Neck! Scrape off!

It feels like my skin is being burned with acid.

He fell to the floor I looked down on him Now I have a gun in my hand I hate guns I hate having guns 'cause I'm Batman

And as a side note, Batman hates guns because his parents were killed by guns a long time ago.

But just for a second my eyes glowed white To talk to you in a language that the bastard who got this could probably understand

Clink!

(Sound of drums) They crawled out Toxic waste or chemical sludge puddle The bastards disappeared into oblivion

And it's just me and the manager

I got him up and wiped the sweat and cheap perfume off his forehead

He begged me not to hurt him He grabbed him tight by the collar He brought it close to my face He was taller than I was But I fooled him with a cape So when I looked him right in the eye He listened

I just said one word "go home"

He walked away, looking back every three meters

I swept from building to building along his path 'cause I knew his house

I saw him pull out the key with a trembling hand and open the door of the building where he lived.

I went back to bed before he entered the hallway

And I heard him turn on the faucet and pour hot water into a glass.

and put the cup in the sink

I heard his footsteps

As I approached my room, my footsteps slowed down.

He creaked the door open, well, very slowly

I've never been in before, but I'm in

(Drums) He was looking nowhere His face, the color of the summer pavement

I pretended I had just woken up and said, "Oh dad what's wrong?"

the manager didn't say anything

But I looked in the dark, arms loose, I could see his head, well, facing me

He lifted his head so he could see my face and eyes

My cheeks were wet, but it wasn't sweat

Just stood there breathing Like you remember my eyes glowing Like you remember my bulletproof chest Like you remember you were my dad

for a long time i didn't say anything

he turned his back and put his hand on the doorknob

I didn't see you, but I heard you mutter "I'm sorry"

I leaned over and opened the window just a little

Look up high and you'll see me

From where I am (the sound of the cymbals) I could hear it all

(Thank you for applause

(applause)

Mounting a lean horse, the hero of "Don Quixote" charges into a horde of giants.

For him it is his duty in the name of the dear lady Dulcinea to extinguish the giants It is his duty in the name of the dear lady Dulcinea

This seems like a brave move, but it's thoughtless.

As his squire Sancho Panza has repeatedly explained, they're not giants, they're just windmills.

Don Quixote still charges, but his sharp spear is quickly caught by the blades of the windmill.

Undaunted, the knight rises proudly and reaffirms his mission.

This is Alonso Quixano's illogical and sentimental heroic saga. This is Alonso Quixano's illogical and sentimental heroic saga.

Originally spread over two volumes, the story follows Don Quixote as he travels through central and northern Spain battling evil forces.

Despite giving Don Quixote such a high degree of imagination, the author, Miguel de Cervantes, never imagined that his book would become the best-selling book of all time.

Aside from five years as a soldier and five years as a pirate slave, Cervantes spent most of his life as a struggling poet and playwright.

In his late 50s, he finally released his masterpiece, a satire of chivalry novels.

At this time, the books of the Middle Ages were dominated by European culture, describing the adventures of knights and their moral codes.

Cervantes was an aficionado, but he was fed up with these tomes that contained the same content, with more emphasis on heroic deeds than on character development.

In defiance of these books, he wrote Don Quixote, the story of a lazy nobleman who spends all his time reading novels of chivalry.

Indulged in chivalric novels, he makes himself a fighter for the oppressed.

Everyone in the village tried to stop his folly, which went too far, including burning some of his own eerie library.

But you couldn't stop Don Quixote.

Dressed in old but shining armor, he mounts a lean horse and leaves the village in search of glory.

Cervantes' novel unfolds in a series of episodes recounting the calamities of the brave knight.

But unlike chivalry books, and perhaps even fiction written before them, Cervantes' story delves deeper into the protagonist's inner self.

As the story progresses, Don Quixote undergoes remarkable changes.

Because of this literary surprise, many scholars refer to Don Quixote as the first modern novel.

This character's growth didn't happen in solitude.

In the early stages, Don Quixote is joined by a villager named Sancho Panza as his squire.

Sancho and Don Quixote are polar opposites. One is a realist with common sense, the other is an idealist.

Their vibrant and developing friendship is often seen as the archetype of the hero-sidekick duo, which has influenced the relationships portrayed in fiction for centuries.

Don Quixote was a big success

In the 17th century, numerous revisions circulated throughout Europe.

Even in the Americas, where the Church banned all novels as a distraction and sinful, people are said to have enjoyed pirated copies.

The book was received so positively that readers demanded more.

A rival author tried to make money by publishing a fake sequel, so Cervantes responded to public demand and published an official sequel.

The second volume, which is published on top of the first volume, is complete.

Cervantes translated the success of his novels into the world of his characters by reflecting real life.

This unconventional metacognition has created philosophical complexities as the knight and his squire ponder the meaning of their stories.

Unfortunately, Cervantes sold the book's copyright cheaply.

He died with only fame being rich.

But his work on creativity and individualism has influenced art, literature, popular culture, and even political revolutions.

Don Quixote argued, "Imagination has the potential to change behavior by having such a powerful influence on our behavior that it can even make us more human."

Many amputees still feel its presence.

You can bend a finger that doesn't really exist, feel the rubbing of a watch band, or even have a toenail dig into your finger and feel a throbbing pain.

And, surprisingly enough, people who were born without limbs often seem to hallucinate.

So what causes phantom limbs?

The accuracy of these hallucinations indicates the existence of body maps in the brain.

And the fact that people who were born without limbs can feel limbs that don't exist suggests that we're born with at least a map to begin with.

But the phantom limb that appears after amputation is different than the limb before amputation, which means that many phantom limbs are painful.

To fully understand phantom limbs and phantom limb pain, we need to consider all the nerve pathways from the extremities to the brain.

There are many sensory neurons in the limbs, responsible for everything from tactile sensations in your fingertips to positional sense, which is the spatial location of different parts of your body.

Nerve tracts carry these sensory input signals to the brain through the spinal cord.

Because most of these pathways lie outside the limb itself, most of them survive amputation.

But the loss of a limb changes how signals are transmitted at every step of the pathway.

In amputated limbs, severed nerve endings become thicker and more sensitive, so they can send out pain signals in response to even the slightest pressure.

Under normal circumstances, these signals are blocked by the dorsal horn of the spinal cord.

For a variety of reasons that we don't know about, it seems that pain inhibition in the dorsal horn of the spinal cord is lost after limb amputation, resulting in an enhanced signal.

Once through the spinal cord, sensory signals reach the brain.

Signals are processed in the destination somatosensory cortex.

Every part of the body is mapped to this somatosensory cortex.

Sensitive body parts with many nerve endings, such as the lips and hands, occupy the largest areas.

The homunculus, which represents the divisions of the cerebral cortex, is in the shape of a human body and is drawn in proportion to the size of the regions of the cerebral cortex that correspond to each part of the body.

For example, the region corresponding to the left hand of a violinist is larger than that of a non-violinist.

The brain also increases the area of ​​cortical representation when one part of the body is damaged, to heighten the sense of danger.

This increase in cortical representation area can cause phantom limb pain.

Cortical maps are also likely to be the most responsible for producing sensations in parts of the body that no longer exist, because they still have that cortical area in their brains.

Over time, this area may shrink and the phantom limb may disappear.

But phantom limbs don't always disappear on their own.

In general, phantom limb pain requires a combination of physical therapy, pain management drugs, a prosthesis, and a time course after amputation.

A technique called mirror therapy can be very helpful in increasing range of motion and reducing phantom limb pain.

The patient puts the phantom limb in a box behind the mirror and places the intact hand on the front side of the mirror.

This tricks the brain into thinking it's seeing a phantom limb, rather than just feeling a phantom limb.

Scientists are developing virtual reality treatments that will make the mirror therapy experience even more lifelike.

Prostheses can also cause similar effects, and many patients complain of more pain when they remove their prosthesis at night.

The phantom limb, in this case, may be helping the patient to perceive the prosthetic limb as part of their body and to intuitively handle it.

There are still many questions about phantom limbs

We don't know why some people feel the phantom limb but don't feel pain, which is common in people who have had an amputation, or why some people don't feel the phantom limb at all.

And further research into phantom limbs goes beyond their application to people who experience phantom limbs.

A deeper understanding of hallucinations will help us understand how our brains work every day and how we construct the world around us from what we perceive.

We must not forget that the reality we experience is subjective in nature.

ok let me start with an introduction

my mom jenny took this picture

In the middle is my father, Frank.

And to my right are my daughters, Mary Catherine, Judith Ann, Teresa Marie.

Sitting on my lap is John Patrick and to the left is Kevin Michael.

And the girl in the light blue windbreaker is me, Susan Diane.

I was happy being raised in a big family

I especially liked the time to think of names.

By the time baby number seven was born, the middle name options were nearly exhausted.

After a long wait, we finally settled on Jennifer Bridget.

I think every parent here knows the joy and excitement of thinking of a baby name.

Together with my mother, I experienced the excitement and thrill of this wonderful moment.

But this spectacle is not everywhere

I have visited many areas and seen many

One of the things that really surprised me was when I visited Ethiopia, where parents don't name their babies for a month or more.

Why?

Why don't we enjoy this special and precious time

they were afraid

when the baby dies

If I don't even give you a name, the unbearable pain will ease a little

They thought that if we didn't even give them a name, their bond wouldn't be even a little stronger.

In our world, in one country, the presence of a baby can make you feel joy and excitement, and you can dream about the future of that child.In another country, the parents of a new baby can be terrified, unable to see their child's future just a few weeks from now.

I wonder why?

Why do 2.6 million babies around the world die before they are even one month old?

2.6 million

This number is the same as the population of Vancouver.

Even more shocking is the cause of death.

Most of the time it's unexplained

The newest pie chart I've seen recently is

It was titled "The Global Cause of Death Under 5".

And the biggest section of this graph, about 40 percent, was labeled "neonatal."

"Newborn" is not the cause of death

"Newborn" is just an adjective, meaning less than one month old.

To me, the cause of death, "newborn," looked like "unexplained."

I'm a scientist and a doctor

I want to do something

But if you can't define it, there's nothing you can do about it.

To reclaim our parents' dreams, the first thing we had to do was try to answer the question, "Why do babies die?"

Today, I'd like to talk to you about a new initiative that I feel is an approach that will not only explain why babies die, but it will revolutionize the way we think about global health.

It's called "precision public health"

The term "precision medicine" has a special meaning to me.

I was trained as an oncologist.

He wanted to alleviate the patient's condition.

But all too often, the treatment made them suffer.

I still remember the young women who were brought into my clinic by their mothers, and they had to get into the clinic with their mothers' help.

They were weakened by my treatment.

At that time, even at the forefront of cancer treatment, there were few options for treatment methods.

The therapy could not distinguish between cancer cells, which it should attack, and healthy cells, which it should spare.

And the side effects you're all familiar with: hair loss, nausea, a weakened immune system, constant threat of infection, it's always been like this.

And so I stepped into the realm of biotechnology.

We're researching a new approach to breast cancer patients that can more effectively distinguish healthy cells from diseased or cancerous cells.

An anticancer drug called Herceptin

Herceptin can precisely target HER2-positive breast cancers, which at the time were the most threatening form of breast cancer.

Because of its precision, it can hit cancer cells harder, while being gentler on healthy cells.

this was a big breakthrough

At the time, it felt like a miracle, and today, even more, we use big data, self-monitoring, whole-gene sequencing, and more to address a wide variety of diseases.

These technologies make it possible to give each individual patient the right treatment at the right time.

Precision medicine has revolutionized cancer treatment

everything has changed

But I want to make another change

I keep asking myself, are we going to limit this smart, accurate, disease-fighting method only to wealthy countries?

And don't get me wrong, I'm not trying to bring expensive drugs like Herceptin into the developing world, which of course would be great if we could.

What I'm here for today is to apply the idea of ​​providing precision medical care to the individual to the problem of public health in the population.

Some of you may be thinking, "She's crazy."

"Impossible" "Too ambitious"

But here's the reality: in some areas, it's already being implemented and is starting to yield significant results.

Let's take a closer look

I told you I was trained as an oncologist.

In the 1980s, in San Francisco, many doctors, myself included, also trained as AIDS doctors.

It was a tough time

AIDS is a death sentence

all my patients died

The situation is improving, but HIV/AIDS remains a serious global problem.

17 million women worldwide are diagnosed with HIV

We know that HIV-infected women can transmit mother-to-child transmission when they become pregnant.

We also know that, without treatment, half of all babies born will die before their second birthday.

But we already have the knowledge that antiretroviral therapy largely prevents mother-to-child transmission.

what should i do

One possibility is to test and treat pregnant women around the world with uniform antiviral therapy.

there will be an effect

but not practical

So why not instead focus on the regions with the highest HIV prevalence?

In certain areas of sub-Saharan Africa, where HIV prevalence is highest, it is possible to test and treat pregnant women.

This precise approach to public health has cut mother-to-child transmission of HIV by about half in the last five years.

(Applause) The screening of pregnant women in a specific area of ​​the developing world is an important example of how the application of precision public health can have a huge impact.

Then

how to achieve

we can do this because we know

Who should focus on what where and how

A key factor in the application of precision sanitation is who, what, where and how.

Now let's go back to the 2.6 million babies who die in their first month of life.

The problem here is that the cause of death is unknown.

Believe it or not, in areas with the highest infant mortality rates, the way to identify the cause of infant death is to talk to the mother.

A health worker asks a mother who has just lost her baby, "Has the baby been vomiting? Did she have a fever?"

This conversation takes place three months after the baby has died, at most.

Thinking about my mother's feelings

It's a very painful and painful conversation

And sadly, conversations aren't very informative, because we knew if you had a fever or vomiting, and we didn't know what caused it.

By ignorance of this fact, we are failing to protect mothers, their families, and many others in the community from the same tragedy.

But what if we could apply precision sanitation?

As an analogy, let's say you identify mother-to-child transmission of a bacterium called group B streptococcus as a cause of death in babies in a region of Africa.

Without treatment, the mother's baby is seven times more likely to die.

Once the cause is identified, the death can be prevented by means as cheap and safe as penicillin.

we can look to the future and act

And this is the key point: if we knew this fact, we could save lives with the right medical interventions in the right places, for those in need.

Through this approach, through interventions, and through other similar methods, we believe that the application of precision sanitation will enable us to reach the Sustainable Development Goals (2015 goals).

And then we can create a world that continues to save the lives of a million babies every year.

1 million babies are saved each year

no need to stop

Imagine what's possible for a stronger approach to public health.

We should be able to address the challenge of malnutrition more effectively.

It should be possible to prevent cervical cancer in women.

Eradication of malaria is possible

(Applause) Yes, please clap!

(Applause) I live in two different worlds, one of scientists and one of public health professionals.

The key to the application of precision sanitation is to bring two worlds together.

But we all live in two worlds, the rich and the poor.

The application of precision sanitation that I'm most excited about is building bridges in a world divided between rich and poor.

What's happening in the world of money is that we're at our disposal with incredible powers and tools to precisely target disease and treat it in ways that were previously unimaginable.

Of course, we can also use those abilities and tools to stop the deaths of babies in poor countries.

If it could happen, every parent would confidently name their baby as soon as it was born and think about their child's future for decades, not days.

thank you

(applause)

Good evening

If you noticed my last name is Nutt

You may have wondered how the nut (stupid) got into the conflict zone.

I actually got a job, right out of medical school, in Somalia, in the midst of civil war, as a volunteer for UNICEF, with a salary of one dollar.

It was essential that I get paid, even if it was just a dollar, so that in the unlikely event of an evacuation order from the United Nations, I would be treated as an employee.

In fact, we were on our way to one of the most dangerous places in the world.

If you've read this far and wondered about one thing, just in case, I got half of it up front, of course.

(Laughter) And that's how I ended up in Baidoa, Somalia, with 50 cents in my pocket.

Journalists called it 'the city of death'

It's called that because 300,000 people died there, 300,000, mostly from hunger and disease from the war.

The mission of my team was to find the best way to deal with this humanitarian tragedy.

It was right after the genocide in Rwanda, when aid to the region was running out.

Unfortunately, many of the aid groups had to put their activities on hold.

I was tasked with finding the answer to a question that asks aid workers in conflict zones around the world: "What am I going to do now?"

If I were to compare the security situation in Somalia back then -- and it's still not much better -- it was like a Clockwork Orange Mad Max.

One thing I remember particularly well to this day is when, a few days after I arrived, I went to the clinic that doubled as a food distribution station.

There were dozens of women in line, with little children on their sides, cradling them tightly.

After about 20 minutes of talking to a young woman, I leaned over and tried to put my finger on the baby's palm.

And the baby was already in rigor mortis.

His body was stiff and his little lifeless hand was still clenched.

He had been dead for hours, and the cause of death was malnutrition and dehydration.

I later found out that this woman had been held captive for two days with a dying baby in her arms. She had been captured by teenage boys with Kalashnikov rifles and threatened to give her money, even though she knew she didn't have it.

This is the situation that I've encountered in conflict zones around the world: children this small, maybe eight years old -- children who have never been to school.

They fight and use automatic rifles to kill people.

Are we just saying that reality is like this?

Some people say that war and humans are inseparable.

After all, it's as old as human history.

It happens again and again and again, even though I swear it will never happen again.

I have seen the worst of the worst things that we humans can do to others, and yet I believe that this status quo can be changed.

What is the basis for that?

Because in my more than 20 years of working in this profession, traveling in and out of conflict zones around the world, I've learned that there are aspects of this problem that all of us who share this space can change, not through force, coercion, or aggression, but by looking at everything we can do to choose the options that deter war and lead to peace, rather than the options that lead to war at the expense of peace.

how?

Now let me tell you a fact: today there are at least 800 million small arms and light weapons in circulation around the world.

The vast majority of those baby civilians who die in conflict zones around the world are under the hands of various armed groups, relying on an almost infinite supply of cheap, easy and convenient weapons to intimidate, intimidate, rape and commit brutal acts against these civilians in all circumstances.

how cheap

In certain parts of the world, AK-47s are available for as little as $10.

In many of the places I've worked, automatic rifles are more readily available than clean drinking water.

Well, here's the point. Is there anything we can do about it?

Before you think of an answer, first look at this world map.

Let's color the countries that are currently in conflict, and count the people who have died or been persecuted because of this violence.

It's going to be a shocking number, more than 40 million people.

I think there are other things to notice about this map.

These countries are mainly located in the global South.

Now let's take a look at the top 20 small arms exporters in the world.

What do you know?

green country

You can see that most of them are in the Global North, mostly Western countries.

Here's what we know

Most of the people who die in war live in poor countries, while most of the people who benefit from war live in rich countries, people like you and me.

Leave small arms here for now

When looking at all the weapons and armaments in circulation around the world

Which country is the biggest seller?

About 80 percent of the weapons come from none other than the five permanent members of the United Nations Security Council, plus Germany.

It's a shocking story

But now the person who thinks like this "Yes, yes, but hey, Nutt-kun" (nut: idiot)

(Laughter) When I was in elementary school, this name was very popular.

It's such a wonderful memory

(Laughter) Anyway, some of you may be thinking, "But aren't these weapons in conflict zones the result, not the cause, of the violence that afflicts people every day?"

"But in places like Iraq and Afghanistan, it's a good thing because you need weapons to uphold law and order, to improve security and security, to fight terrorist groups."

Let's take a second look at this view: the small arms trade exploded in the wake of the war on terrorism.

In fact, the industry has grown threefold in the last 15 years.

Now let's compare the number of people directly killed in armed conflicts around the world during the same period.

What do you know?

In fact, this number has also increased by about three to four times.

At the end it extends to the same place

Now, the debate may go back and forth: is this increase in death toll the result of more small arms, or the other way around?

But here's what we really have to learn

What I mean is, we need to really dig this correlation out. Especially considering that the small arms that were shipped to Iraq for the Iraqi National Army, and the small arms that were supposed to be shipped to Syria for "moderate" dissident fighters, are now in the hands of ISIS, and that the weapons that were shipped to Libya have leaked and are now thriving in the illicit trade in the Sahel, ending up in the hands of Boko Haram, al-Qaida, and other armed groups.

that's exactly the problem

Because small arms are dangerous no matter where they are, because they always leak.

The annual global military spending is equivalent to $249 per person in the world's population, and $249 per person is about 12 times more foreign aid, the money spent in the global South on children's education, immunizations and malnutrition.

But this imbalance can be improved.

what should i do

Well, at the end of the day, it's a matter of supply and demand, so we have to deal with both sides.

On the supply side, I think we can call on governments to adopt international mechanisms that promote arms transparency, like the Arms Trade Treaty, which holds rich countries accountable and requires them to disclose where their exported arms go and what they're used for.

The United States is by far the world's largest arms exporter. President Obama duly signed the Arms Trade Treaty, but it's not yet in force, it's not legally binding.

This is the part where our voices should be heard.

Regulating small arms is not going to solve the problem of war.

Adding more regulatory mechanisms won't solve the problem.

But it's an important step in the right direction.

It's up to all of us in rich countries to make a difference.

But what about the demand side?

Around the world, generations have been lost to war.

We can stop this cycle of violence through investment in education, strengthening legislation, and especially in improving the economic well-being of women.

From what I've seen myself, the impact of these efforts is very powerful anywhere in the world.

The only problem is that it takes time, and if you personally want to help out with a donation or something, by all means, do so.

But how much you donate is just as important as how much you donate.

Giving on a regular basis, such as monthly, is much more efficient, so that humanitarian organizations can plan well, invest for the long term, and be close to the lives of war-torn families, even though we quickly forget there was even a war.

As a young doctor, when I boarded the plane to Somalia, I had no idea what it would be like to live in a war.

But now I understand

I've experienced it firsthand, and I can still remember lying in bed in the dark, hearing the sound of machine guns.

I just listened, and I trembled as much as I could, wondering how many more minutes it would be before I became a beehive.

It's a ghastly, maddening terror that millions of people around the world, not even for a single day, can escape from, especially children.

Over the years I've been doing this job, I've lost too many people close to me to war.

On at least a few occasions, I almost narrowly escaped death.

But I have a firm belief that this is what drives me every day, that we can make different choices.

Because war is what we humans do after all.

We sell, we buy, we spread, we fight

So it's not like we don't have the power to solve it.

On the contrary, we are the only ones who can solve it.

Thank you very much I wish you all the best

(applause)

I don't think I need to introduce Norman, but TED is watched by a lot of people all over the world, so I was told to start with a biography, because that alone would easily take 18 minutes.

93 years of life in less than 93 seconds

(Laughter) Born in New Hampshire.

It's New Haven, Connecticut

New Haven, Connecticut

(laughs) I wasted seven seconds.

I did it

(Laughter) I'm from New Haven, Connecticut.

Your father is a scammer, isn't he?

You were nine years old when your father was sent to prison.

Participated in 52 airstrikes as a fighter pilot during World War II.

Returned from the war - I was a radio operator.

I went to LA to work in Hollywood, first in public relations, then in television.

I carved out my own path without formal training as a broadcaster.

His breakout and debut film was All in the Family

Hit after hit, still hard to beat in Hollywood today: "Sanford and Son," "Maud," "Good Times," "The Jeffersons," "One Day at a Time," "Mary Hartman, Mary Hartman."

All commercially — (Applause) Not only were they all commercially successful, but many of them were cultural impetus, and for the first time, voices from marginalized segments of society reached primetime programming.

At one point, seven shows were in the top 10 most popular shows.

At one point, the total number of weekly viewers of your work reached 120 million.

That's more people than "Super Bowl 50" viewers, because it's only once a year.

It's amazing

(Laughter) (Applause) It's too early to say, "Wow."

(Laughter) You're on President Richard Nixon's nemesis list.

This is where we applaud

(Applause) We were inducted into the Television Hall of Fame at the same time.

Then enter the movie industry

"Fried Green Tomatoes" "The Princess Bride Story" "Stand By Me" "Spinal Tap"

(Applause) And this is just a small part.

(Applause) And then, as a new challenge, I started the third act of my life as a political activist focused on defending the First Amendment and separating church and state.

Founded People for the American Way

He bought the "Declaration of Independence" and returned it to the people.

Continuing to be active in both the entertainment and political worlds, at the mature age of 93, he wrote a book and made a documentary about his life.

You've done it all, and you're finally here at TED.

(Laughter) (Applause) I'm glad to be here.

I'm also grateful to you for accepting my interview.

Thank you for your request.

ok first question

were you proud of your mother

(laughs) Mother

do i start from there

I wish I could put it this way When I came home from the war my mother showed me the letter I had sent from the war It was a total love letter

(Laughter) This story sums up my mother very well.

Like a love letter, it was like a love letter written to a lover

A year later, I asked my mother if she could return the letter, because I wanted to keep it with me for the rest of my life.

mother threw away the letter

(Laughter) That's my mother.

(Laughter) If I were to try to summarize it in terms of more recent events -- the most recent, but a long time ago -- was when the Hall of Fame you were talking about just started.

One Sunday morning, I got a call from a representative from the Academy of Television Arts and Sciences.

It was to let you know the result of yesterday's all-day conference in absolute secrecy.

I almost said Richard Nixon, because Richard Nixon - he's not on that list.

William Paley, who started CBS David Sarnoff, who started NBC Edward R. Morrow He's the best foreign correspondent Paddy Chayefsky I think he's the greatest TV writer Milton Berle Lucille Ball And me

not bad

I immediately called my mother in Hartford, Connecticut.

"Mommy listen, I'm starting the Hall of Fame"

When I named the winners, including myself, my mother said, "If you say you'll let me in, that's fine."

(Laughter) (Applause) That's my mother.

It makes you laugh in a certain way, because it's a side that all mothers have in common.

(Laughter) And that's where the sitcom Jewish Mother came from.

Now, your father also had a big impact on your life, in the form of his absence.

I agree

Tell me about what happened when you were nine years old

My father was going to fly to Oklahoma with three guys About the three guys my mother said, "I don't want you to get involved with them, I can't trust you."

Then my father probably said the cliche line, "Shut up Janet, I'm going."

and gone

As a matter of fact, my father had obtained fake bonds and was trying to travel far away to sell them.

He got on a plane to Oklahoma and tried to get me a ten-gallon hat like my favorite cowboy Ken Maynard wore.

It was only a few years after Lindbergh crossed the Atlantic.

It was rare to get on an airplane back then.

But my dad came home and got arrested when he got off the plane.

In the evening papers scattered around the house, my father was handcuffed by a detective while his face was hidden by a hat.

My mother was going to move out and put the furniture up for sale She didn't want to live in Chelsea, Massachusetts with the finger pointing

The house was full of people because the furniture was for sale

In the midst of all that chaos, a funny idiot put his hand on my shoulder and said, "Now you're the breadwinner of the family."

I was crying and the idiot said, "You're the breadwinner of the family."

And at that moment, I began to understand that a truly comical situation could arise.

after that

It's been years since I've finally been able to look back on that scene and say it was a learning experience.

But it's interesting to hear that it's been described as a learning experience.

It was useful in the sense that it turned into a spring

I mean, I've come to think it's too funny to say to a crying nine-year-old boy, "You're the breadwinner of the family."

When I was crying, he added,

So

(Laughter) So

Looking back, I think I learned back then that there is such a ridiculous situation, and I've used that experience all my life.

So you had an absent father and a mother who, from what I've heard, never satisfied with anything.

Do you think that having a childhood that nobody listened to would have led to the life you've grown up to be an adult that attracts 120 million weekly viewers?

That's a good way to ask a question, maybe I've lived my life just wanting my voice to be heard

Well, the short answer is yes, that was the reason, but there were other things

When my father wasn't around, I was fiddling with the ore radio I made with my father when I heard Father Coughlin's preaching program.

(laughs) Somebody laughed

(Laughter) It's not funny, because this priest was also an idiot, and he said he didn't like the New Deal and Roosevelt and the Jews.

That was the first time I realized that there are people out there who hate me just because I was born to Jewish parents.

it made a huge impact on my life

Well, you had a childhood without a strong male role model, except for your grandfather.

Please tell me about your grandfather

it's my grandfather

I always talk about my grandfather like this

There was a parade, when I was a child, there were various parades

Wasn't there a Veterans Day parade or President's Day?

Lincoln's Birthday Parade, President Washington's Birthday, Flag Day, etc.

There were various small parades

My grandfather took me and he was standing on the street corner holding my hand and I looked up and tears were streaming down his eyes.

My grandfather was an important person to me

My grandfather used to write letters to the President of the United States.

Each letter began with "Dear Mr. President" and described the wonderful policies that the President had taken.

Even when I disagreed with the President, I wrote, "Dear Mr. President, didn't we tell you last week?"

(Laughter) I would sometimes run down the stairs to pick up the mail.

I lived on the fourth floor, 74 York Street, New Haven, Connecticut.

So I got a little white envelope that said, "Shire C. has come to visit."

This is the story of my grandfather that I always talk about.

I showed them the real thing, and I actually told Phil Donahue, and others before that, the same story in about a dozen interviews.

This is the second time I've admitted that the whole story was a lie.

It's true that my grandfather took me to the parade, and I've been to many.

It is also true that tears flowed from my grandfather's eyes

It's true that my grandfather used to write letters sometimes.It's true that I received mail.

But "Dear Mr. President," and the rest of the story, I borrowed it from a friend, and my friend's grandfather was the one who wrote the letter.

You stole Arthur Marshall's grandfather and made it your own.

always

When I started writing my autobiography, 'Until this--' was a good title.

"I have experienced this"

When I started writing my autobiography When I thought about this

So much so that I borrowed Arthur Marshall's grandfather.

The word father - by the way, I have six children.

I love my role as a father

And the role of wife Rin's husband

But I stole other people's identities because I needed a father figure.

After going through all kinds of troubles, I became a father and I forgave him For better or for worse, when I think of my father, these words come to mind: My father was "naughty"

The fact that my father was a liar, a thief, and deceived people went to prison.

Replace it with the word "naughty"

There is a saying, "Amateurs borrow, professionals steal."

i'm a pro

You're a pro

(Laughter) This quote is commonly attributed to John Lennon, but apparently he stole it from T.S. Eliot.

you had a friend

(Laughter) I'd like to ask about your work.

We all know the impact of your work, and of course you hear it all the time, what it means to people, what it means to our culture, and you heard the cheers when you mentioned your work. Half the people here grew up watching your show.

Have you ever been surprised by the impact of your work?

Of course I was surprised and happy from head to toe.

Last year there was an event called "An Evening with Norman Lear" where hip-hop promoters and performers from the Television Academy met.

its subtitle is

―Because you were 92 years old at the time, it was ``What the 92-year-old Jew has in common with the hip-hop world.''

Russell Simmons on stage with six others

When I talked about the show, I wasn't talking about Hollywood, I was talking about George Jefferson from my fifth show, The Jeffersons.

Did the little things give him a big- impact?

Shocking, I hesitated whether to call him "changed"

Never thought I'd change someone's life, but he said so

When George Jefferson wrote a check on the show, he said he'd never seen a black man write a check before.

He said it was shocking to him and changed his life.

When I hear stories like this, the small things are, I'm sure all of you here in the audience did small things for others today.

The prop man on the set put the checkbook on something and George casually signed the check as he said his lines That's about it

But that means, in addition to the biography I mentioned at the beginning, I should have said that I was the father of hip-hop.

(laughs) well

The next thing I would like to ask you is- go ahead.

(Laughter) You've had a lot of accomplishments and a meaningful life.

Balancing is hard and not everyone can do it.

Even those who have achieved both, it's rare to find a good balance between them.

Through your work, you have boosted culture and achieved global box office success at the same time.

how did you reconcile

What do you think when your achievements are read out?

Earth is just one planet out of billions, I hear it's one universe out of billions and billions of universes, and that one universe has billions of planets.

The one planet that we try and must protect is Earth.

but

All of the things I've accomplished, my sister has been asking me what I should do about Newington, Connecticut.

I said, "Write a letter to the City Councilor or the Mayor."

"I'm Claire, not Norman," my sister said.

That's when I said for the first time what I was talking about, "Claire, what you think I've done and what you've done--" My sister has never left her hometown--"Considering the size of the earth and the universe, the difference between what you and I have done is immeasurably small, don't you think?"

in short

I'm sure you've done as much as I've done

I get what you're saying, and it's obviously biased -- but you have to think in terms of the scale and perspective of the world that God created.

But on earth you are important

big man

(Laughter) Last question.

How old do you feel?

I'm the same age as the person I'm talking to

so i'm 93

(Applause) Are we done?

I feel like I'm 93 years old now, but someday I want to feel as young as this person in front of me.

You were the one and only Norman Lear.

(Applause) Thank you.

(applause)

The sheer passion of taking photos that tell stories drives me.

Generally speaking, a photograph is a momentary record of a single moment.

Every moment, every photograph represents a visible and definite fragment of memory in the flow of time.

But what if a single photograph could capture more than one moment in time?

What if we could use photography to break down the notion of time and crammed the best moments of both day and night seamlessly into a single picture?

I created a concept called "Day to Night," which I believe will change the way people see the world.

because it was so for me

My work begins by photographing iconic places scattered in people's memories.

Determine a spot with a good view and shoot from there without moving even for a moment.

Capturing a series of moments in which humans and light change over time

The shoot takes 15 to 30 hours and takes over 1,500 photos, from which we choose the best moments during the day and at night.

Using time as a guide, it seamlessly stitches together the passage of time from day to night into a single photograph, depicting our consciousness as it flows through time.

See the view from the Tournelle Bridge in Paris

These are people rowing boats along the Seine at dawn.

And at the same time, you can see Notre Dame lit up at night.

And between morning and night, you can see the romance of the City of Light

Shooting from 15 meters above the ground is my main style, but all the pictures you've seen were taken on the same day.

"Day to Night" is a global project, and my work is always related to history.

I have a strong interest in visiting places like Venice and seeing it with my own eyes during certain events.

I decided to go see the historic "Regatta", an event that has been going on since 1498.

The ship and its passengers look exactly the same as they did then.

And I hope you all understand that we don't just shoot two separate moments, we shoot all day and all night long.

I cut out special moments and collect them greedily.

I am driven by a sense of urgency that I don't want to miss even one of those moments.

The concept of "Day to Night" was born in 1996

LIFE magazine asked me to do a panorama photo of the cast and crew of Baz Luhrmann's movie "Romeo + Juliet".

When I got to the set, I realized it was square.

So the only way to make a panorama is to take 250 photos and stitch them together.

Captured DiCaprio and Claire Danes hugging

As I moved the camera to the right, I noticed there was a mirror, and I could clearly see the two of them in the mirror.

So for this moment and for this painting, I asked you to kiss me, I asked you to kiss me.

And so I went back to my studio in New York, and I hand-stitched 250 photos, piece by piece, and I looked at the whole thing and thought, "This is amazing!

I can draw the flow of time in the photograph.”

And I kept this concept alive for the next 13 years until technology caught up with my dream.

This is "Day to Night" taken at the Santa Monica Pier.

I'm going to show you a short video to give you a sense of what it's like to accompany me during a shoot.

So let me start by explaining that most of the time you spend photographing these landscapes at high altitude, usually inside an aerial platform or a crane.

On this day, as usual, we continued filming for 12 to 18 hours without a break.

Fortunately, I love people-watching.

All I can say with confidence is that if the view was from my house, it would be great.

But this is how I make these kinds of works.

Now, once you've decided on a scene and a location to shoot, you have to decide when the morning starts and when the night ends.

I call it the "time vector"

Einstein said he likened time to fabric.

Think of the surface of a trampoline, which flexes and stretches under the influence of gravity.

I also think of time like a piece of fabric, but in my case I compress that fabric into a single flat photo.

A unique aspect of this work, as you can see from my photos, is that the time vector changes, sometimes from left to right, sometimes from front to back, from top to bottom, sometimes diagonally.

I'm searching for an expression that connects time and space in two-dimensional still photographs.

When I'm compositing photos, it's almost like I'm doing a parallel puzzle in my mind.

Photographs are assembled around time, and this is called the "original plate."

This process will take several months to complete.

What's interesting about this job is that no matter what day you shoot, once you're up on the set, there's nothing you can do about it.

So it's all about who's in the picture, what the sunrise and sunset looks like, and so on.

Now for the final stage of the process, if it's going to be really good all day and everything will change, then we'll decide who to keep in the picture and who to remove, based only on time.

The best moments selected over the course of a month are seamlessly cut and pasted onto a single original plate.

It merges day and night as I see it, creating a singular harmony between two utterly incompatible worlds.

My work has always been strongly influenced by painting, for example Albert Bierstadt of the Hudson River school is a great painter.

His work inspired me to shoot a series of national parks recently.

This is his painting of Yosemite National Park

And here's a photo of Yosemite that I made.

"National Geographic" featured in January 2016 issue

It took me over 30 hours to take this photo.

I was just hanging on the cliff, and I kept filming the stars and the moon as they moved, and the moonlight shone down on the monolith of El Captain.

And we've captured the shift in time across the landscape.

The highlight, of course, is how the extraordinary moments that people see change over time, from day to night.

As a matter of fact, I had a copy of Bierstadt's painting in my pocket.

And when the sun started to rise over the canyon, I was literally shaking with excitement. I looked at the painting in my hand and thought, "Wow, this is exactly what Bierstadt painted 100 years ago."

"Day to Night" is, after all, a crystal of everything I hold dear in the medium of photography.

It's landscape, it's street photography, it's color, it's architecture, it's about perspective, it's scale, it's about history.

This is one of the most historic photos I've ever taken, from the inauguration of President Barack Obama in 2013.

If you look closely, you'll see that each of these large screens reflects the passage of time.

Mrs. Michelle and the children are waiting, then the president's address, then the oath, and finally the speech.

There are so many challenges with taking these photos.

Especially for this picture, I was shooting from an aerial work platform 15 meters above the ground, and my footing was unsteady.

Every time my assistant and I changed our center of gravity, the horizon tilted.

I took about 1,800 photos to create the picture you see here, and I had to keep my feet in place every time I clicked the shutter.

(Applause) I've learned so many great things from this job.

The most important of these, in my opinion, are patience and observation.

When you take a bird's-eye view of a city like New York, for example, people in cars that you see in everyday life are no longer "people in cars."

Like a shoal of fish, they move together as a group.

People often talk about the vibrancy of New York City, and I think this photo really captures part of it.

If you look closely at my work, there's a story in it.

Times Square looks like a canyon, and light and shadow emerge.

So I decided to arrange time in a grid in this picture.

Wherever there is shadow it is night, and where there is sun it is always day.

Time is something extraordinary, beyond human comprehension.

But I think the photographs I'm making are beginning to capture time in a unique and particular way.

It's embodying a new metaphysical visual reality.

If you stare at a place for 15 hours, you start to see things from a slightly different angle than you would with a camera, take a picture, and walk away.

This is a typical example

I call it "Sacre Cool Selfie"

I've been watching for over 15 hours, and no one has paid any attention to the Sacre Coeur itself.

I was more interested in using temples as backgrounds for photographs.

Walk over, take a picture, and leave

I don't know of a better example of the vast chasm between what we think of as "experience" and what experience itself is evolving to.

I found that the act of sharing became more important than the experience itself.

(Applause) Finally, my latest work, which has a special place in my heart, in Tanzania's Serengeti National Park.

Taken in the center of Seronera, this is not a reserve.

We aimed at times of great migration, and we wanted to capture the widest range of animal diversity.

Unfortunately, when we visited, despite the peak of migration, it was still dry, five weeks of drought.

So every animal was looking for water

When I found this source, I felt that if everything that was going on there continued, it would be a great opportunity to capture something special.

We spent three days exploring the waterhole, and at this point we had no idea what we would actually see.

I spent 26 hours photographing from a hunting hideout six meters above the ground.

And I witnessed an unimaginable scenery

it was like a page in the bible

For 26 hours, animals competing for survival shared one resource: water.

It is said that humans will continue to fight for the next 50 years over the same resources.

The animals didn't even show animosity towards each other.

You seem to understand something that humans don't.

And that means that we all have to share the precious resource of water.

When this photograph was completed, I realized that "Day to Night" was really a new way of looking at things, condensing time and exploring the continuum of space and time that photography hides.

Technology thrives with photography, not only to capture the deeper meanings of time and memory, but to weave new, previously unknown stories and create windows into our world through time.

thank you

(applause)

What are the French better at than other nations?

If you did a poll like that, the top three answers would be love, wine, wineing

(Laughter) Maybe

In addition to that, I would like to suggest one more thing: mathematics.

No city in the world has as many mathematicians as Paris.

No street is so named after a mathematician.

Statistically speaking, France has the highest percentage of people in the world who have won the Fields Medal, also known as the Nobel Prize of mathematics, given to mathematicians under the age of 40.

What is it about mathematics that fascinates the French so much?

Mathematics can seem abstract and boring, or just a calculation with rules and numbers.

Mathematics may be abstract, but it's not boring, and it's not all about math.

Mathematics is about argumentation and proof, and that's the core of what mathematicians do.

use imagination, the ability we admire most

is the pursuit of truth

I can't say the joy I feel when, after months of thinking, the problem has been solved and the correct proof has finally been demonstrated.

André Weil, the great mathematician, likened this pleasure -- seriously -- to sexual pleasure.

The difference is that the sensation lasts for hours, sometimes days.

the payoff is great

Mathematical truths lurk throughout this physical world.

We can't feel it with our senses, but we can see it through the lens of mathematics.

Now close your eyes for a moment and think about what's going on around you.

There are countless invisible particles in the air around you that are constantly hitting your body in a completely random way.

Still, the statistical value of motion can be accurately predicted by mathematical physics.

So let's open our eyes and look at the stats of that particle's velocity.

This is the famous bell-shaped Gaussian curve -- the law of error -- the deviation from the average behavior.

This curve is a statistical representation of particle velocities in the same way that demographics represent age distributions.

one of the most important curves

This is very important for us mathematicians as a great universal truth that emerges time and time again from many theories and experiments.

About the Gaussian curve, the famous scientist Francis Galton said, "If the Greeks had known this law, they would have deified it.

This is the supreme law of anarchy."

The Galton board is the best embodiment of this supreme goddess.

Inside, there's a narrow tunnel through which tiny marbles drop randomly, right, left, left, and so on.

It's completely chaotic and chaotic movement.

Let's see what these chaotic orbits do together.

(Shakes board) This is a little exercise, because we have to clear the traffic jams in here.

here we go

Anarchy might do something interesting here.

came out

Supreme Goddess of Anarchy

A Gaussian curve is trapped in this transparent box, like Dream, the main character in The Sandman.

I'm just going to show you this as an experiment, but in my class I'll explain why there's no other way than this curve.

Touching the mystery of the Supreme Goddess, beautiful coincidences give way to beautiful arguments.

Science is like this

A beautiful mathematical argument is not only a mathematician's delight,

change our worldview

For example, Einstein Perrin Smoluchowski, who mathematically analyzed a set of chaotic orbitals and Gaussian curves, proved that everything in existence is made of atoms.

This isn't the first time mathematicians have turned our worldview upside down.

More than 2,000 years ago, in ancient Greece, something like that was already happening.

At the time, only a fraction of the world had been explored, and it would have seemed as if the planet was infinite.

The wise man Eratosthenes used mathematics to measure the circumference of the earth with an astonishing accuracy of just 2 percent.

Another example is

In 1673, Jean Richet noticed that the pendulum moved a little slower in Cayenne than in Paris.

From this observation alone, and with some clever mathematics, Newton came up with the exact idea that the Earth's poles are just a little bit flatter.

What these examples show is that mathematics can take us beyond the realm of intuition, allowing us to measure the seemingly endless size of our planet, detect atoms we can't see, and things we can't perceive with our five senses.

If there's one thing you can take away from my talk, it's that mathematics lets us explore things beyond our intuition that are difficult for our senses to comprehend.

A modern example that you're all experiencing is this: searching the Internet.

World Wide Web All over 1 billion pages Want to check it out?

All that computational power would be, but without a mathematical model to discover the information hidden in the data, it would be useless.

Let's think in terms of easy-to-understand problems

Imagine, you're a detective working on a case, and you have a bunch of witnesses, each with a different point of view.

who will be interviewed first

You're the primary witness, even if you look at it rationally.

So, Witness 7 is going to tell a story, and when you ask Witness 7 about the source of the information, he says he heard it from Witness 3.

Then Witness 3 might say that Witness 1 was the source of the story.

Now, Witness 1 is going to be the primary witness, and you really want to make hearings from that person the top priority, right?

But from this graph, Witness 4 can also be considered the primary witness.

It might be a good idea to debrief him first, because a lot of people will be saying his name.

In this case, it's easy, but what if there are too many people to testify?

Also, this graph seems to represent people testifying in complex cases, but it also represents websites that refer to each other's URLs.

Which site is the most reliable?

not very clear

This is where PageRank comes into play, one of Google's first major features.

This algorithm uses the law of mathematical chaos to automatically determine the most relevant websites, the same principle as the law of chaos seen in the Galton Board experiment.

So let's try to feed a little digital marble into this graph and let it slide through.

Each one arrives at a site and chaotically traverses one link after another.

so is every ball

Little by little, the marbles pile up, and the number of visits to each site — the number of digital marbles recorded.

let's go

disorderly and scattered

Let's make it more interesting by jumping in total chaos every now and then.

Look, out of chaos comes solution.

The highest number of marbles is the site with the most links and the highest number of referrals compared to other sites.

Now you know exactly which website you want to see first.

Again, the solution comes out of chaos.

Of course, since then Google has implemented more sophisticated algorithms, but PageRank was already working really well.

Problems still occur, but only about once in a million times.

With the advent of digital technology, the number of problems to which mathematical analysis can be applied has increased, and mathematicians' jobs have become increasingly useful, to the point that a few years ago, according to The Wall Street Journal, in 2009, mathematicians climbed to the top of the list of 100 jobs in the "Top 100 Jobs" survey.

mathematician is the best job in the world

The reason is its wide range of applications: communication theory, information theory, game theory, compressed sensing, machine learning, graph analysis, harmonic analysis, and more.

Stochastic process Linear programming Fluid simulation available

They are widely applied in various industries.

Through these, mathematics brings great benefits.

And we have to admit that when it comes to using math to get rich, the United States is by far the best in the world.

With all this beauty, usefulness and richness, mathematics looks all the more fascinating.

But don't think that a mathematician's research life is easy.

The solution is filled with confusion, frustration and a desperate struggle for understanding.

Let me tell you about one of the most memorable days of my life as a mathematician.

I guess I should say it was the most memorable night.

At the time, I was at the Institute for Advanced Study, Princeton, where Albert Einstein worked for years, and it's arguably the most sacred place in the world for the study of mathematics.

That night I was working on an elusive proof and it remained incomplete.

It was about the contradictory stability of the plasma, which is a collection of electrons.

In a perfect plasma world, there's no collision, no friction, creating the stability we're used to.

But if the plasma is even slightly out of balance, the electric field will eventually vanish or decay of its own accord, as if by some mysterious frictional force.

This paradoxical phenomenon is called "Landau damping," and it's one of the most important phenomena in plasma physics, and its existence has been proven mathematically.

However, this phenomenon was not fully understood mathematically.

Together with my former student and principal collaborator, Clément Mouhot, who was in Paris at the time, I had been working on the proof for months.

Actually, I misunderstood that I had solved it and published it.

In fact, there was no proof of that.

Over 100 pages of complex mathematical logic, many discoveries and a lot of calculations, but it didn't work.

That night at Princeton, I was freaking out because the logic of the process of constructing the proof didn't quite connect.

I used energy, experience, and all sorts of methods, but nothing worked.

It was the same at 1:00, 2:00, 3:00 in the middle of the night.

Around 4 o'clock, I went to bed depressed

A few hours later, I woke up and said, "It's time to take the kids to school." And then, what is this?

I could hear a voice in my head saying

"Take the second term to the other side of the equation, Fourier transform it, and inverse transform it in L² space."

(laughs) This is it! that was the first step to a solution

I thought I was resting like this, but my brain was actually working.

At such times, you don't have your ambition or your colleagues in mind, just the problem you're working on and yourself.

Having said that, it doesn't hurt that your hard work pays off and you get a promotion.

After completing the massive proof of Landau damping, I was fortunate enough to receive the most coveted Fields Medal at the hands of the President of India in Hyderabad on August 19, 2010. It's a mathematician's dream, and I will remember this day until the day I die.

What do you think about my feelings at that time?

pride? of course

In addition, I would like to thank all of my collaborators for making this possible.

Because this was a joint adventure with people, and it should be shared with people who aren't collaborators.

I believe that everyone can experience the excitement of mathematics research and share the passionate stories of the people behind it.

Together with my staff and collaborators at the Henri Poincaré Institute and the artists of mathematical expression from around the world, I'm committed to creating a very special and unique museum of mathematics at the Henri Poincaré Institute.

When you come to Paris in a few years, after you've tasted delicious crispy French bread and macaroons, please visit the Henri Poincaré Institute and let's dream mathematics together.

thank you

(applause)

The world is full of wonderful works and rich cultural treasures.

When we touch these things, we are amazed and captivated.

But people all over the world usually have very few opportunities to actually experience art and culture.

So when we try to explore the cultural treasures, the beautiful places, the works of art around the world, where do we go?

Before I start my presentation, let me clear up a few things.

First of all, I'm not an arts or culture expert.

I stumbled upon it by accident and now I love it

And everything I'm about to show you is owned by the wonderful museums, archives and foundations that we're affiliated with.

Not owned by Google

And finally, what I see behind me can now be seen on smartphones and computers.

This is our current system, which allows you to explore thousands of museums and collections in ultra-high resolution, at your fingertips.

What's really amazing is the diversity of content.

If there were only European paintings and contemporary art, it would have been a little boring.

For example, this month we launched a channel called "Black History," a channel of 82 temporary exhibits that talk about the arts and culture of the black community.

There are also wonderful Japanese works, "Made in Japan" with craftsmanship at its core.

My favorite exhibit in this exhibition is... Actually, this is the crux of my story. I never thought I would become a fan of Japanese dolls.

But thanks to this exhibition, I became a fan and learned about the craftsmanship that underpins the essence of Japanese dolls.

it's really amazing

I guarantee

let's move on

Now, with this system, which you can instantly share with your children and your friends, the short story is that you can go virtually to these amazing places.

One of my recent ideas is about the Guggenheim Museum in New York, where you can really feel like you're there.

You can also go to the first floor.I'm sure most of you have been there before.

This is how you see an architectural masterpiece.

Imagine a kid studying architecture in Mumbai who never had the chance to go to the Guggenheim before has access.

You'll be able to see and explore the collection of the Guggenheim Museum.

there's a lot of information here

But that's not what I'm talking about today.

so far already exists

What we have now is part of an exciting future that will make art and culture and access to it possible.

Joining me on stage today is my friend Cyril Diane, artist-in-residence in our Paris office, professor of interactive design at the Lausanne University of Fine Arts in Switzerland.

Cyril and our tech team are trying to find and visualize the connections between art, history and wonder.

let's get out of here fast

What I see behind me is... oh yeah, let me make one thing clear. It's definitely better to see the real thing.

I don't want people to think I'm just copying the real thing.

Let's begin

The work behind me is "Venus of Berekat Ram"

It's one of the oldest in the world, found on the Golan Heights and dating to about 233,000 years ago, in the Israel Museum in Jerusalem.

It's also one of the oldest in this system.

let's zoom in

Let's start with this one point

If we were to actually experience the big bang of our culture as seen from here,

what would it look like?

This is what we do on a daily basis at the Google Cultural Institute, where more than six million works of art, selected by various institutions, are connected like this.

It allows us to travel through time and gain a deeper understanding of our society.

Bringing art and culture together allows us to look at society from a global perspective and try to see what it might look like without boundaries.

In addition, it can be arranged along the time axis, so it is irresistible for me, a data maniac.

You can spend hours just looking at each era, looking at the art, history, and culture that contributed to that era.

I really want you to spend hours looking at it all, but I don't have time right now.

Try it out on your smartphone

(Applause) And if possible, please clap your hands later.

So let's hurry up, let's move on from here to another really interesting idea.

It's not just beautiful paintings and beautiful visuals, but what's the purpose here, and how does it serve you?

The next idea I'm going to show you is based on discussions I've had with curators at museums.

As one curator put it, "Amit, what if we could create a virtual curator's desk? It's a reproduction of a desk on which all six million works are lined up and you can see the connections between them."

You can spend your time looking at things and understanding where they come from.

It's a crazy Matrix experience

(Laughter) So let's move on, let's take the world-famous Van Gogh, who is very well represented in this system.

Thanks to the institutions we work with, we have more than 211 high-definition, stunning Van Gogh works in one beautiful screen.

Now you can break this down into individual paintings, and as Cyril zooms in, you can see all the self-portraits, including a still life.

I'm going to take just one example, and it's a work that's been talked about right now, and it's "Bedroom."

There are three versions of this work: one in the Van Gogh Museum in Amsterdam, one in the Musée d'Orsay in Paris, and one in the Art Institute of Chicago. Now in Chicago, there's actually an exhibition of all three, I think for the second time in history.

On the other hand, here it's digitally and virtually brought together in a completely different way for everyone to see, without feeling cramped in a crowd.

So let me take you on a trip to "The Bedroom," where you can experience how we treat each piece.

We want the images to say as much as possible in the digital system.

All you need is the Internet and a computer. (Applause) Cyril, zoom in more.

I'm sorry, it's all live, so please be patient... I can do the same for any piece, modern art, contemporary art, Renaissance, anything, even sculpture.

Sometimes I don't understand why I am drawn to works of art, museums and cultural discoveries.

It was a big challenge for me myself, because my mom wasn't happy when I decided to do this full-time at Google.

I love my mother, but she thinks museum junk is a waste of her life.

For my mother, an art museum is just a place where she can go out during her free time and check out the works she has seen.

So it took me almost four and a half years to convince my mother, who is from India, of the value of this business.

What happened was, one day, I found out that my mother liked gold.

I tried to show things that used gold as the material.

The first thing my mother asked me was, "How did you buy it all?"

(Laughter) My salary isn't that high, so I said, "Mom, I really can't afford it.

But you can look around virtually."

Now, every time she sees me, she says, "Do you have any more gold or silver? Can you show me that?"

What I wanted to show you is this idea

The entrance can be anything, you just need to experience it

Once you try it, you will be hooked

Let's quickly take a look at what's next. I have an interesting idea for an example entrance. Let's take a quick look.

It's great to see a work of art in person.

But most people can't actually see it, and it's a hassle even for those who can afford it.

Put out Cyril "Art Trip"

I don't have a good name for this yet

We partner with nearly 1,000 amazing facilities in 68 countries.

First is Rembrandt

I think it's time to introduce one

Thanks to the various facilities, we have collected over 500 Rembrandts from 46 facilities in 17 countries.

For example, on my next vacation, I'll try to see all of these works.

So the entire trip would be about 53,000 kilometers, visiting about 46 facilities, and for reference, the carbon footprint would be about 10 tons.

(Laughter) But this is art, so maybe I can justify it somehow.

I'll hurry up and show you something more advanced and interesting.

What you've seen so far is related using metadata.

But these days, there's this amazing technology that everyone is talking about: machine learning.

So I thought, let's remove all the metadata, put the entire collection through image recognition, and see what machine learning can do.

The result is this very interesting map, where each cluster doesn't have a point of reference, it's just a visual element that keeps things together.

Each aggregate looks like a work of art in itself.

One of the things I want to show you is this incredible collection of portraits that I've found in museums around the world.

Zoom in a bit Cyril

If I could travel in a portrait

You can also travel through landscape paintings and horse paintings, it's just a massive collection.

Looking at these portraits, I thought to myself, "Can we do something interesting for children? Can we do something playful to get them interested in portraiture?"

I've never seen a kid so happy to go to a portrait gallery.

So I narrowed down my wits

This is how I made a "portrait match"

It lives up to its name, so let's show Cyril's handsome face.

What's happening is that as Cyril moves his head, he's matching portraits from museums around the world.

(Applause) I don't know about you, but I showed it to my nephew and my sister, and they were so happy.

"When can I come see you?" I ask.

By the way, Cyril, if you don't mind, can you show me a picture of you smiling

I'm here

By the way, I didn't rehearse.

nice cyril it's great

Well, if I don't go next time, I'll run out of time.

(Applause) How about art and culture?

So I'm going to give you a little bit of a final experiment, which we call all experiments, and the final experiment is again about machine learning.

I'm going to show you a visual collection, but what if you asked the computer to name the collection?

What if computers could tag things automatically without using metadata?

So that's what we've built, and that's what we built, and now we have about 4,000 labels.

So far, it's not that great, I just typed in a collection.

Then I found an interesting category

First of all, it is a category of "horse" as it is.

You would think that the computer would come up with an image of a horse.

That's true, but there's something out there that's pretty abstract, but barely recognizable and classifiable as a horse.

There is also a wonderful horse head statue

Each has a tag indicating why it was classified there.

Let's take a look at the following, which is really interesting and interesting, but I don't know why this category came up.

"Woman in Waiting"

Hurry up Cyril maybe you can see a nice picture of the lady waiting or posing.

but i'm not sure

I'm asking the museum, "What's wrong? What happened?"

very interesting

So back to gold for a moment, I wanted to search for gold items, so I looked at the tags that the computer attached.

But it didn't have the tag "gold".

It's time for pop culture

The attached tag was "Kirakira"

(Laughter) Talking too fast puts pressure on Cyril.

Here you'll find all the glitter that's been collected for you from museums around the world.

And finally, what I want you to feel after this story is happiness and excitement.

So if you try to look at "happiness," what do you see?

If you actually look at everything tagged with the word "happiness," you'll see happiness.

And I came across a really interesting piece, by my friend and artist-in-residence Douglas Copeland, titled "I Miss My Brain Before the Internet."

I don't know why the computer tagged it with nostalgia for the pre-internet brain, but it's a really interesting idea.

I sometimes miss my pre-internet brain very much, but not when I'm browsing art and culture online.

Now, let's all use smartphones and computers and go to museums.

And all you have to do is summon the great archivists, the historians, the curators, who keep the culture in the museum.

And at least we and our children can enjoy art and culture every day.

thank you

(applause)

One way to change genes is to create new genes, which Craig Venter has shown very neatly.

Another is to change your lifestyle.

We're beginning to see how powerful and dramatic those changes are, and it doesn't take long to realize their benefits.

When you eat healthier, manage stress, exercise moderately and have a good relationship, you actually get more blood flow to your brain and more oxygen.

But beyond that, your brain will definitely get bigger.

What was thought to be impossible just a few years ago can now actually be measured.

This was revealed before us by Robin Williams, several years ago.

So, there are some things you can do, and by doing them, you'll be able to grow new brain cells.

I also have some favorites: chocolate, tea, blueberries, moderate alcohol, stress management, and the cannabinoids in marijuana.

I'm just telling you

(Laughter) What are we talking about?

(Laughter) Others, on the other hand, have a negative effect and can cause you to lose brain cells.

Like saturated fats (acids) and sugar, common suspects are nicotine, opiates, cocaine, excess alcohol and chronic stress.

Lifestyle changes increase blood flow to your skin, which slows aging and makes your skin less likely to wrinkle.

increases blood flow to the heart

So far, we've proven that we can actually reverse heart disease to a healthy state.

The blockage in the artery shown in the upper left has visibly improved in just one year.

In the heart PET scan shown at the bottom left, the blue areas are where there's no blood flow.

After one year, the orange and white areas represent maximum blood flow.

So far, we've shown that we can stop and reverse the progression of early-stage prostate cancer, and we can do the same with breast cancer, just by doing something to improve it.

In vitro studies found a 70 percent reduction in tumor growth in the lifestyle modification group, compared to just 9 percent in the comparison group.

These differences are highly significant

Increased blood flow to the sex organs may increase sexual potency

Here's one of the most effective quit smoking ads, produced by the Department of Health and Human Services, says that nicotine, which constricts arteries, can cause heart attacks and strokes, but it can also cause impotence.

half of male smokers have impotence

Is it attractive?

Now, an upcoming study that will be published is that we can alter gene expression in people with prostate cancer.

This is called a heatmap, and the different colors represent the genes shown on the right.

More than 500 genes undergo favorable changes, activating good genes and disease-suppressing genes, and inactivating disease-promoting genes.

So these discoveries are really powerful and give many people new hopes and choices.

Genetic profiling companies like Navigenics DNA Direct 23andMe give you that feeling of, "Well, what am I going to do with that?"

Our destinies are not determined by our genes. If we change our lifestyle, the change is just a habit, but if we make a larger lifestyle change than we used to, we can actually change the expression of our genes.

thank you

(applause)

Have you ever been asked by a Chinese friend, "What is the Chinese zodiac?"

Don't assume you're talking about something innocuous.

If you say, "I'm a monkey," you know you're 24, 36, 48, or 60.

(Laughter) Asking for the Chinese zodiac is a non-rude way to ask for the age.

By teaching the Chinese zodiac, you will also be evaluated.

Luck, unhappiness, character, career prospects, even whether the year will be a good year will be judged.

If you give them your mate's Chinese zodiac, they can imagine what your private life looks like.

You may not believe in the zodiac, but

A quarter of the world's population is affected by it, so it's wise to keep it in the back of your mind.

What exactly is the zodiac?

Westerners are familiar with the Greco-Roman zodiac, which divides the year into 12 months.

zodiac is different

It's a 12-year cycle, each named after an animal, starting with the Rat and ending with the Pig, and has nothing to do with any constellation.

For example, if you were born in 1975, it's a rabbit.

Do you know your zodiac sign?

Our Chinese ancestors developed a very complex system of theories based on the yin-yang, the five elements, and the zodiac.

For thousands of years, this culture that many of us are familiar with has influenced people's important decisions: naming, marriage, childbirth, the way they treat each other.

Some of the stories are astonishing

The Chinese believe that each animal has an affinity.

And parents choose the year in which to give birth, because they believe that working together with the right animal pairing will bring prosperity to the family.

Even in romantic relationships, we refer to the Chinese zodiac.

I'm a boar, so I can have a good relationship with a tiger, a sheep, or a rabbit.

The Chinese believe that some animals are natural enemies of each other.

"Boar" I must be careful of "Snake" people

Is there a "snake" person?

Let's talk a little bit later

(Laughter) Some animals are considered luckier than others, like the dragon.

Unlike the Western tradition, the Chinese "dragon" is a symbol of power, strength and wealth.

It's everyone's dream to have a "dragon" child

Jack Ma's parents must have tall noses.

but they're not the only ones

In 2012, the year of the dragon, China, Hong Kong and Taiwan saw a 5 percent increase in fertility rates.

It means that one million more children were born than usual.

Because of the tradition of favoring boys, the male to female ratio was 120 to 100 this year.

When these "dragon" boys grow up, they will face more competition in love and in business.

According to the BBC and the Chinese government, the number of caesarean sections performed peaked in January 2015.

Why?

because it is the last month of the year of the "horse"

It's not because horses are so popular, it's so that children don't become unfortunate sheep.

(Laughter) If you're a "sheep," please don't be disappointed.

These people are also born of "sheep"

I don't think you're a loser

(Laughter) The "tiger" is also a disliked animal because of its volatile nature.

There are many regions in China where the fertility rate drops significantly in these years.

However, it may be better to think about the Chinese zodiac in reverse.The children of "Tiger" and "Sheep" who can live in a place where there is little competition.

I'm rather lucky

I looked at Forbes magazine's list of the top 300 richest people in the world, and it's interesting to note that what should be the least desirable animals are sheep and tigers, which outnumber dragons.

Maybe less competition is a good thing

One last interesting point is that many Chinese people base their investment decisions on the Chinese zodiac.

The idea and tradition of the zodiac has been around for thousands of years, but it's only in the last few decades that it's been used to make important decisions.

Your ancestors had their hands full trying to survive through poverty, drought, famine, riots, pestilence and civil war.

The Chinese people finally have the time, wealth and technology to live the life they've always wanted.

Decisions made by 1.3 billion people collectively drive demand and economic volatility in everything from health care and education to real estate and consumer goods.

With China playing a major role in global economic and geopolitical affairs, decisions made based on the Chinese zodiac and other Chinese traditions are affecting everyone in the world.

Are there any "monkey" people here?

2016 is the year of the monkey

Monkeys are smart, curious, creative and mischievous.

thank you

(applause)

I'm an Iranian-American Muslim woman, just like you.

Also, I'm a "social justice comedian." No matter what anyone says, this is a real job.

To explain what's going on, let me tell you the story.

I've been on the national stage

America is indeed a great country

Breathtaking nature Family restaurant chain Diabetic patients as far as the eye can see

it's really amazing

Now, Americans can be broadly categorized into three categories: mostly nice, anti, and Floridian.

(Laughter) Except for Floridians, the hardest thing is "anti".

They're in the minority, but they more than make up for it, they're loud.

Because the population is statistically small, some people have a "little inferiority complex" similar to Napoleon's, and some people have really raised shoes.

As a social justice comedian, my goal is to convert the antis, because they hate anything that has a negative impact, like racism, violence, Ted Nugent.

That's not all. You're probably missing 3-7.

But the important thing is to do something about the antis.

But even within the group, there are differences, so it's not very efficient to deal with them all at once.

So I created a very scientific taxonomy of antis.

I took all the haters, put them in a petri dish like a scientist, and found these categories:

(laughs) First of all, "vandalism"

This is a common digital anti

People who quit their jobs to post on YouTube all day long.

Then "Tsujigiri anti"

People who stop at a red light, wait for the light to change, and when it turns green, they yell, "Go back to your country."

I used to actually get out of my car and take my hatred to your face.

They're no longer what they were back then.

(Laughs) The next group is the "anti-proselytizing and prejudiced, but because it's connected to the organization, it doesn't look like it at first glance."

These people are very good at spreading hatred through seemingly benevolent organizations like churches and non-profits, and they tend to speak in old fashioned ways.

But what I'm most interested in is "floating anti".

These people are like floating votes in elections, they can't decide for themselves.

I was dizzy in terms of thought, discriminating or not

This is due to lack of information

This group is the target of social justice comedy.

So why comedy?

Because when you evaluate everything from comedies to leaflets, the average American likes comedies, as you can see in this graph.

(Laughter) It's pretty popular.

By the way, this graph is mathematically correct, even though the original numbers are nonsense.

(Laughter) So the question is, why does social justice comedy work?

First, because it makes you laugh, and

because when you smile, your heart opens up

If you're open minded, a good social justice comedian can throw tons of information into it, and if you're really good at it, you can even do a rectal exam.

(Laughter) Now, there are a few basic principles of social justice comedy.

This isn't a political comedy, it's about justice, and no one is against justice.

The second is to be open and warm, to make you feel like you're inside a burrito.

And the third thing is that it's funny, but it doesn't really stand out, and sometimes interesting stories about income inequality, for example, are hidden under the most sophisticated gossip.

(Laughter) Let me introduce you to what I think is an effective social justice comedy.

A few years ago, I got a large group of Muslim-American comedians -- no violence -- (Laughter) -- and I traveled around the country doing comedy shows in places like Alabama, Arizona, Tennessee, and Georgia -- places where people love Muslims.

The title of the tour is “Muslims are coming! 』

(Laughter) And as soon as the film was released, a well-known hate group launched a $300,000 anti-Muslim poster campaign with the MTA, New York City Transit Authority.

It's a really nasty poster, and of course it's badly designed, because if you want to be that obsessed, you should use a better font. (Laughter)

So we thought, why don't we start a poster campaign to promote the movie and spread the goodness of Muslims.

My fellow comedian D. Ovidaller and I decided to do a hilarious poster campaign to fight prejudice.

We raised the money and spent more than five months negotiating with the MTA, and the poster was approved, but two days after it was due to be posted, the MTA decided to cancel it, saying the content was "political."

let's see some here

This one

"Muslim facts: Muslims invented the concept of 'hospital'"

this would be nice

“Fact: Muslims can do more push-ups as adults than as babies.”

(Laughter) "Fact: Muslims invented Justin Timberlake."

(Laughter) Take another look.

"The Scary Truth About Muslims: They Have a Tasty Omelette Recipe"

The MTA seems to have taken the omelet as political.

It's been called "political" just because it's positive about Muslims, but that's not true.

This is a matter of "justice".

So we decided to turn the Fighting Prejudice Hilarious Poster Campaign into the Fighting Prejudice Hilarious Courts Campaign.

(Laughter) And to put it simply, some of the worst comedians took on a big New York institution, and the comedians won.

(Applause) Thank you.

I won and it felt so weird

I thought, 'Do blonde girls always feel like this?

I love it! ”

(Laughter) Let me introduce you to another one.

Everywhere I go, people ask me, "Why don't Muslims condemn terrorism?"

I'm actually doing it, but let's get caught here

I decided to start thedailydenouncer.com

This is a website that denounces terrorism every day, but it's closed on Saturdays and Sundays.

see the contents

I usually post one-panel comics "I blame terrorism! Some people don't replenish printer paper!"

What I want to emphasize on this site is that even if you condemn terrorism, it's actually ridiculous to continue condemning it day in and day out.

By the way, even if you don't care about bigotry, social justice comedy can help you with just about anything.

My fellow comedian Lee Camp and I went to the Cayman Islands to investigate offshore finance.

America loses about $300 billion a year to tax havens.

I don't want to brag, but at the end of each month, I have between $5 and $15 in disposable income.

So I went to different banks in the Cayman Islands and asked if I could open a bank account with eight dollars and twenty seven cents.

(Laughter) Every branch manager gave me 30 to 45 seconds, and then called security.

When the security guards show up brandishing weapons, we run away screaming in terror, and that's the final principle of social justice comedy, because sometimes it's terrifying enough to make a big deal out of it.

Most stories are aimed at laughter

I'm trying to create human connection and laughter.

Sure, you can get kicked out by the guards.

Sometimes I get nasty tweets and hate mail.

Sometimes I get voicemails that say, "If you keep joking, I'll kill you and your family."

These threats are no joke.

But I think that socialist comedy is one of the most powerful weapons, even though it can be dangerous at times.

Because there are many attempts to achieve social justice, such as war and figure skating.

But there are still many unpleasant things

So isn't it time for some clever dirty jokes?

thank you

(applause)

I've lived in rural East Africa for about 10 years, and I'd like to share a local perspective on world poverty.

I believe that humanity's greatest failure is leaving more than a billion people behind.

Hunger, extreme poverty, these problems are so huge that we tend to think we can't solve them.

But as a field worker, I believe that these problems are actually solvable, if only we took the right steps --

Archimedes, the ancient Greek philosopher, taught us that with the right levers, we could even move the earth.

I think there are three powerful levers we can use to fight extreme poverty.

I'll tell you what it is and why it makes poverty solvable in our lifetimes.

What does extreme poverty look like?

When I first moved to rural East Africa, I spent the night with a farmer's family.

they were great people

Invite me to your house and sing a song with you for a simple dinner

gave me a blanket to sleep on the floor

But in the morning there was nothing to eat

And at lunchtime, I watched with growing pains, as the oldest girl in the family made porridge for lunch.

The children ate one cup at a time to keep their lives alive.

I can't tell you how sorry I felt.I knew I had to accept their hospitality when they handed me that cup.

Children need food not only to survive, but to grow physically and mentally.

With each day without food, a little bit of their future is lost.

In extreme poverty, one in three children will experience the stunting effects of malnutrition for the rest of their lives.

This situation, combined with inadequate medical care, causes one in ten children in extreme poverty to die before the age of five.

And only a quarter of children finish high school because they can't afford the fees.

Hunger and extreme poverty stunt human potential in every way.

We think of ourselves as thinking, compassionate, ethical human beings, but until we solve this problem for all of us, we can't live up to those norms, because everyone on this planet matters.

this kid is important

these kids are important

And this girl is also important

We are disturbed when we see situations like this, but the problem seems too big.

I don't know how to do it effectively.

But remember our strong ally Archimedes

We have powerful leverage against global poverty.

no different than any other problem

As a practitioner who lives and works in the field, I believe that these situations can be resolved.

So for the next 10 minutes, stop being pessimistic about the state of the world.

let your brain work

Let's combine our passions to solve problems, and see what levers we have.

First leverage Most of the world's poor are farmers

think how awesome this is

If this picture represents the poorest people in the world, more than half of them are engaged in agriculture as their main source of income.

This fact excites me

All these people are in one profession —

think how powerful it is

If farmers were more productive, more than half of the world's poor could earn more and move out of poverty.

that's not all

Agricultural produce is, of course, food.

So when agriculture becomes more productive, they get more food, which not only helps them, but also contributes to healthy communities and thriving economies.

And the more productive farmers are, the less impact they have on the environment.

There are only two ways to feed everyone in the world. You can either make existing farms more productive, or you can cut down forests and grasslands to create more farmland, but you're destroying the environment.

The farmer is basically the fulcrum of vital leverage.

When farmers become more productive, they earn more, they lift themselves out of poverty, they benefit their communities, and they reduce their environmental impact on the land.

Farmers are at the center of the world

It's not people like this, but rather people like this woman.

Many of the farmers I know are actually women.

Look at the will and strength emanating from this woman.

She is physically and mentally strong and will do anything to give her child a better life.

If the future of mankind were to be entrusted to one person, I think it would be her.

(Applause) There's just one problem: many smallholder farmers lack access to basic equipment and knowledge.

Today, they're using what little grain they've harvested and set aside last year, sowing it into the land and plowing it by hand with a hoe.

The tools and techniques are the same as they were in the Bronze Age, which is why many farmers are still very poor.

But I have good news

The second lever: Humanity solved the problem of agricultural poverty a century ago.

Now let's take a look at each of the three basic elements of agriculture.

First, by crossing two species, you get a hybrid seed.

If you pollinate a naturally high-yielding variety with a drought-tolerant variety, you get a hybrid that inherits the good traits of its parents.

Second, regular fertilizers are environmentally sustainable when used properly.

By adding just a pinch of fertilizer to crops taller than me, I get a much higher yield.

This is called an "agricultural input"

Agricultural inputs must be combined with good practices

By spacing the seeds and planting them with plenty of compost, farmers can increase yields.

These proven tools and methods have more than tripled agricultural productivity in key regions around the world, and lifted millions out of poverty.

We just don't have these things for everyone, especially sub-Saharan Africa.

this is very good news

Humanity solved the problem of agricultural poverty a century ago — in theory.

We just don't get these things out to everyone.

The reason poor people remain in this century we live in may be because they live in remote areas.

Lack of access to these things

So ending poverty is a simple matter of providing proven tools and services.

We don't need the genius type anymore

Whoever delivers this honestly will end world poverty in our lifetime.

These are the three levers, and the most powerful one is simply delivering.

Poverty can be eliminated when the world's businesses, governments, and nonprofits build networks that deliver goods that improve lives.

Good in theory, but what about in practice?

what such a network looks like

I'm going to give you a concrete example that I'm most familiar with, and that's my organization, the Once Acre Fund.

Our organization is dedicated to farmers, and our job is to give them the tools they need to succeed.

It starts with delivering the goods needed for agriculture to remote areas.

It may seem difficult at first, but I'm going to show you that it's possible.

Together with our network of farmers, we purchase agricultural supplies and store them in 20 warehouses like this.

And they rent hundreds of 10-ton trucks for delivery and deliver them to waiting farmers.

Farmers take orders and bring them back to their farms

It's kind of like the Amazon for rural farmers.

The point is, to realistically deliver, you need an account, a payment method.

Farmers pay little by little over time, covering most of our expenses.

we do these processes with training

Our local workforce provides practical, hands-on training to local farmers once every two weeks.

Farmers are using the tools to lift themselves out of poverty wherever we serve.

This is a consolata of farmers who participate in our program.

look at her proud face

I believe it's a human right for every hardworking person on the planet to reap the modest successes she's had.

Now, I'm proud to support about 400,000 farmers like Consolata.

(Applause) The key to doing this is scalable delivery.

They hire local workers in remote areas in any area, and they serve an average of 200 farmers and over 1,000 of their families.

We currently have 2,000 local personnel in remote areas, and it's growing rapidly.

This is our delivery force, but we're just one organization.

Many companies, governments and nonprofits have delivery teams like ours.

And I think we're now at a point where, collectively, we can provide agricultural services to all farmers.

let me show you how it's possible

This is a map of sub-Saharan Africa with the United States next to it for size comparison.

We chose Sub-Saharan Africa because of its vast delivery area.

this is very challenging

But when we analyzed the continent in 50-square-mile blocks, half the farmers lived in these colored areas.

All in all, this is a surprisingly small area.

If you put these blocks together and put them on a map of the United States, you barely cover the eastern part of the United States.

You can order pizza anywhere in this realm and it will come to your home still hot, fresh and delicious.

If America can deliver pizza to an area this size, then African companies, governments and nonprofits should be able to bring agricultural services to every farmer.

this is possible

Let's wrap up by talking about generalizing beyond agriculture.

In all areas of human development, humanity has already invented effective tools to end poverty.

All you have to do is deliver it

Again, in all areas of human development, long ago, smart people invented tools that were cheap and effective.

Humanity is armed with a simple and effective solution to poverty.

We just need to bring it to these small areas.

Let's take the map of sub-Saharan Africa again as an example, and remember that rural poverty is concentrated in this blue area.

Urban poverty is concentrated in even smaller green dots.

Again, using the map of the United States as a comparison, I call this the high-probability delivery area.

In fact, for the first time in human history, we have a massive delivery infrastructure.

Businesses, governments, and non-profits around the world maintain delivery forces that are sufficient to cover these relatively small areas.

we just lack the will

Each of us has a role to play if we're willing to do it.

First, more people need to go into human development, especially if they live in developing countries.

We need more frontline health care workers, more teachers, more agricultural leaders, and more sales agents selling life-enhancing products.

These people are messengers who dedicate their working lives to improving the lives of other people.

But we also need a lot of helpers.

My organization alone needs so many roles, but we're just one of many.

It may surprise you, but whatever your area of ​​expertise, you have a role to play in this battle.

And although it is logistically possible to end poverty, we need more resources.

this is the biggest problem we have

If you're an individual investor, you need venture investments, private equity investments, and a significant increase in working capital for emerging markets.

But there are limits to what the private sector can do alone.

Private companies sometimes find it difficult to profitably help the poorest, so charities still have a big role to play.

Anyone can donate, but we need leadership.

We need powerful forward-looking philanthropists and global leaders to address human development issues and lead the effort to rid the planet of poverty.

If you're interested in these ideas, check out FinishPoverty.org

we need more leaders

mankind made man reach the moon

We created a supercomputer that fits in your pocket and connects you to anyone in the world.

I am running a marathon at a pace of 5 minutes per mile.

Humans have great power.

And yet we're leaving over a billion people behind.

We can't be a truly ethical, fair human being until every girl, like the one in this picture, reaches her full human potential.

Logistically, eradicating poverty is entirely possible.

It's just about bringing proven goods and services to everyone.

Each of us has a role to play, if we're willing.

Invest our time, our careers, our wealth

End extreme poverty in our lifetime

thank you

(applause)

40 million Americans are currently in debt on their way to the new economy.

I can't afford to go to college until I graduate, and I owe over a trillion dollars.

I have to find any kind of job to pay off the inescapable debt.

In America, even bankrupt gamblers have a second chance.

But getting your student loan forgiven is almost impossible in America.

A long time ago, in America, you didn't go to college and graduate with debt.

My friend Paul's father graduated from Colorado State University using the VA Act.

In his generation, higher education was seen as a benefit to society as a whole, so it was either free or almost free.

not now

When Paul himself graduated from Colorado State University, he worked part-time to pay his tuition and earn an English degree.

Thirty years ago, higher education was affordable and cheap, and no matter how much debt I had, I paid it off by the time I graduated.

not now

Paul's daughter followed in his footsteps, but with one difference: She graduated five years ago with a huge debt burden.

Students like Kate have to take out loans because the cost of higher education has become too high for most American families to afford.

But is this a problem?

It's not such a bad idea to spend money on education and take on debt, but if it helps you earn more money and pay off the debt.

But here's the thing

The same college graduate earned 10 percent more in 2001 than in 2013.

in short-

Tuition went up, subsidies were cut, family incomes were down, personal incomes were down.

Isn't it surprising that more than a quarter of students are unable to pay their student loans?

But the worst of times also have a bright side, because they reveal truths that can't be ignored.

Today I will tell you three truths.

The 1.2 trillion dollars in debt to get a degree clearly shows that higher education has become a commodity that you can buy.

We see education, like economists, as an investment that enhances the value of human capital through vocational training.

We see it as an investment in classifying and classifying people to make it easier for employers to hire them.

U.S. News & World Report's college rankings are like Consumer Reports' washing machine rankings.

Terminology for education is brutal

Teachers are “service providers” Students are “consumers”

Sociology, Shakespeare, football, science, they're all "content."

Student debt is profitable

But you're not the one making the money

Your debt is what makes the student loan industry profitable.

Two giants, Sallie Mae and Navient, made $1.2 billion in combined profits last year.

Like mortgages, student loans are bundled, packaged, and sold on Wall Street.

Universities investing in these securitized loans make double profits.

From your tuition and from the interest on the debt.

With this much profit, some parts of the higher education business could turn to false advertising, bait and switch,

I wouldn't be surprised if they took advantage of people's ignorance and exploited them under the guise of education.

And third, degrees are now brands.

A teacher of mine wrote many years ago, "If students are treated like consumers, they will be consumed with envy and obsession."

Just as consumers are forced to buy new iPhones with every version upgrade, education is forced to buy one after another.

It's already been called "university is the new high school."

But why not end it in college?

That's because you're forced to buy more and more diplomas, from Master's to PhD.

higher education is also sold as status

You buy a degree, like you buy a Lexus or a Louis Vuitton bag to stand out from the crowd.

so you'll be the envy

A degree is a brand

But the truth is often drowned out by noisy sales pitches.

You can't go a day without hearing this pitch from some policy expert on TV: "A degree is essential to getting on the escalator to middle-class life."

And what's often used as evidence is the data that college graduates earn 56 percent more than high school graduates.

But let's take a closer look at the numbers, because at first glance, they contradict what we often hear about college graduates working in coffee shops and cash registers.

45 out of 100 people who go on to some form of higher education do not complete their studies on time for a variety of reasons, including financial issues.

Of the 55 graduates, 2 are unemployed and 18 are unable to find a job commensurate with their abilities.

Even if college graduates earn more than high school graduates, is that enough to justify the exorbitant tuition fees and wages they weren't able to earn while in college?

Economists now agree that only those who successfully graduate will benefit.

On the other hand, it's because the wages of high school graduates have fallen tremendously over the last few decades.

For decades, high school graduates haven't been getting paid enough to match what they produce.

For many of us, going to college would have been a bad investment if we had the income we were supposed to get.

Is this a university advantage?

No, I think it's the devaluation of high school graduates.

2 out of 3 people who go to college don't find the right job

Their future is bleak -- and dire indeed.

These are the people who suffer the most from student loans.

Interesting and sad at the same time, they were the ones who were touted to the advantage of college.

It's not just ironic, it's cruel marketing.

what should we do

What if students and even parents treated higher education as a commodity?

because everyone is already doing it

And then, like any other product, you're going to want to know what you're paying for.

When I buy medicine, I get a list of side effects.

Even the purchase of the product of higher education should be accompanied by a cautionary tale so that the consumer can make an informed choice.

When you buy a car, you know the mileage per liter

Do you know what you can do with a degree in Canadian Studies?

There is actually such a field.

What if there was an app that knew that?

An app that shows the cost of a college major and the expected income.

Let's call it "income-based tuition" IBT

please make someone

(Laughter) Let's face reality.

(Laughter) IBT has three advantages.

First, anyone can find out how much they'll earn after graduation from their college or department.

If you can understand that, you'll be able to avoid being a victim of pushy sales.

And you can choose wisely

Does it make sense to pay more than 15% of your increased income in tuition to qualify for a college degree?

Second advantage of IBT

By tying tuition and income together, university administrators will be forced to find creative ways to control costs.

For example, students pay roughly the same tuition in all departments.

It's clearly unfair and should be changed.

Engineering students need more resources and equipment and labs and faculty than philosophy students do.

As a result, philosophy students are subsidizing engineering students.

On top of that, engineering students get paid more.

Two students are buying the same product for the same price, but one of them gets half or a third of the service.

In fact, if you're a college graduate, you'll pay 25 percent of your income for one major and only 5 percent for another major to pay off student loan interest.

If individual majors were assessed more accurately, this inequality would disappear.

Of course, someone here will look into all this data, right?

Information gathering should be well planned and publicly audited by accounting firms to prevent false statistics.

You know how dangerous statistics are, right?

Anyway, the final and biggest benefit of IBT is that it frees Americans from the threat and actual bankruptcy of buying defective products.

Maybe one day, as the previous speaker said, Americans, young and old, will rediscover their curiosity and love of learning.

Knowledge may inspire you to pursue the path of inquiry you seek.

That's exactly the kind of young man that Eric and Kevin were two years ago, and they're the ones who inspired me through their work with indebted students, and who I still work with today.

thank you

(applause)

War has been a part of my life for as long as I can remember.

I was born in Afghanistan, just six months after the Soviet invasion. I was too young to know what was going on, but there was an air of deep suffering and terror all around me.

That experience had a profound impact on how I view war and conflict.

I've found that most people won't give in when something really important comes up.

When conflicts like this, when human rights are violated, when your country is occupied, when you're persecuted, when you're forced into submission and humiliation, you need strong ways to resist and fight back.

No matter how devastating and horrific violence may be, if people see it as their only option, they will choose it.

Most of us are concerned about the current state of violence worldwide.

But telling people the inhumanity of violence doesn't stop wars.

We must provide tools that are at least as powerful and effective as violence.

that's my job

For the last 13 years, I've been working to educate some of the world's most vulnerable peoples about how to fight conflict through non-violent struggle.

Everyone associates this kind of behavior with Gandhi and Martin Luther King.

For thousands of years, people have acted non-violently.

In fact, most of the rights we have in America today -- women's rights, minority rights, labor rights, sexual orientation rights, environmental citizenship rights, are not given to us.

It was won by those who fought and sacrificed for it.

But we haven't learned from that history. Nonviolent warfare as a technique is widely misunderstood.

I recently met with a group of Ethiopian activists, and they said something I hear all the time.

They said they had already tried non-violent action and had failed.

They used to protest

They were all arrested by the government and that's it.

The real problem is the idea of ​​nonviolent struggle = street demonstration.

Protests can be a great way to show that people want change, but they don't, by themselves, bring change, at least fundamental change --

[I'm against this! ] (Laughter) You're a formidable opponent, so just because you're asking politely doesn't mean you're going to do what the people say.

It's the same as making a bad request

[I don't like it! ] (Laughter) Non-violent struggle works not when you actually attack your enemy, but when you identify the mechanisms that keep your enemy alive and deprive him of the source of his power.

Nonviolent activists neutralize the military by urging soldiers to secede.

slow down the economy through strikes and boycotts

By creating new media, we can counter government propaganda.

There are various methods used for that

My colleague and mentor, Gene Sharp, came up with 198 methods of non-violent action.

resistance is one

let me give you a recent example

Until a few months ago, Guatemala was run by corrupt ex-military officials with ties to criminal gangs.

Most of us were aware of it, but most of us felt there was nothing we could do about it. But then, a civic group of just 12 people took to Facebook and called on their compatriots to gather in Central Park with this message: "Renuncia YA" -- resign now.

And to my surprise, 30,000 people showed up.

While the crowd remained there for months, protests spread across the country.

At one point, organizers sent hundreds of eggs to various government buildings, writing messages like, "If you don't have enough balls to stop a corrupt candidate from running, we'll lend you ours."

(Laughter) (Applause) President Molina responded by declaring that he would never resign.

So activists knew that just continuing to protest and demanding resignation wasn't enough.

I had to force him to resign without warning.

So they organized a general strike, and people across the country refused to work.

In Guatemala City alone, more than 400 businesses and schools have closed their doors.

Meanwhile, farmers across the country blocked highways.

Within five days, the president summarily resigned, along with dozens of other government officials.

(Applause) I've been greatly inspired by the creativity and courage of non-violent people in nearly every country in the world.

For example, a group of activists in Uganda recently released a transport box full of pigs into the streets.

You can see how the police are having trouble dealing with it.

(Laughter) The pig was painted in the colors of the ruling party.

One of them was even wearing a hat, a hat that everyone knows.

[Yoweri Museveni, President of Uganda] (Laughter) Activists around the world are getting better at appealing to the media, but if it's not part of a larger strategy, individual actions have little effect.

Generals don't send troops into battle if they don't have a plan to win the war.

And yet nonviolent activism is happening almost unplanned around the world.

Nonviolent struggle is at least as complex as military combat.

The participants must be well-trained, have a clear objective, and the leader must have a strategy for achieving that objective.

The techniques of warfare have advanced over thousands of years, using vast resources and the best human minds dedicated to understanding and improving how they work.

On the other hand, very little systematic research has been done on nonviolent struggle, and although the number of leaders is increasing, it remains only a few dozen.

That's a dangerous thing, because we know that the old-fashioned approaches to dealing with conflict are not well suited to the new threats we face today.

The U.S. government recently admitted that it's stuck in the fight against ISIS.

But what few people know is that people are fighting ISIS through non-violent action.

When ISIS took over Mosul in June 2014, it announced that it would introduce a new public school curriculum based on its extremist ideology.

But on the first day of school, not a single student showed up.

His parents stubbornly refused to let him go to school.

Parents appealed to the media that they would rather educate their children at home than brainwash them.

This is just one example of resistance in just one town.

But what if this is in concert with dozens of other nonviolent resistance movements against ISIS?

What if the parent boycott is part of a larger strategy to identify and cut off the resources ISIS needs to operate? What if the strategy was to separate ISIS from the skilled labor needed to produce food, the engineers needed to extract and refine oil, the media infrastructure, telecommunications networks, transportation systems and local businesses?

It may be difficult to imagine defeating ISIS through non-violence.

But it's time to challenge the way we think about conflict and the choices we make in facing it.

So this is an idea worth spreading. Let's learn where nonviolent action can help, and how we can make it stronger, just as we've made other systems and technologies continually more efficient and better suited to human needs.

We may be able to advance nonviolent action to the point where it is increasingly used as a substitute for war.

Violence as a tool of conflict may be abandoned as the bow and arrow fell out of use, as we have replaced the bow and arrow with more effective weapons.

Human innovation can make non-violence more powerful than the latest technology of warfare.

Humanity's greatest hope is not to condemn violence, but to make it "a relic of the past."

thank you

(applause)

What does it mean to "make good use of your time"?

I spent a lot of time thinking about how to spend my time

In a way, I feel like I'm possessed.

friends think so

But I feel like I have to because lately it feels like time is slipping through me, and when that happens, I feel like a part of my life is slipping away.