So why do we remember some things and not others?

There are several things that affect the range and efficiency of memory retention.

For example, memories formed during times of excitement or stress are often recorded because the hippocampus is associated with emotions.

One of the key factors that contribute to memory consolidation, you know, is a good night's sleep.

Sleep consists of four stages, the deepest of which is known as slow-wave sleep or rapid eye movement.

When these stages were measured with an electroencephalograph, they observed that electrical impulses travel from the brainstem to the hippocampus, thalamus, and cortex, which act as relay stations for memory formation.

We also found that different stages of sleep consolidate different kinds of memories.

In non-REM slow-wave sleep, declarative memory is encoded and temporarily stored in a location in the anterior portion of the hippocampus.

Through interactions between the cortex and hippocampus, repeated activations are gradually transferred to long-term memory storage in the cortex.

REM sleep, on the other hand, has been linked to consolidation of procedural memories because it mimics brain activity in the waking state.

Studies show that ideally, you should go to sleep three hours after learning the formula and one hour after practicing the scale.

Now, do you realize that not only is poor sleep bad for your long-term health, but it also makes it harder for you to make the most of what you learned and practiced the night before.

If you think about the restructuring and formation of new connections that occur in your brain while you sleep, you might say that getting a good night's sleep means that you wake up each morning with a new and improved brain to face your challenges.

At the dawn of 1905, Einstein, who was about to turn 26, was facing a life of failure as a scientist.

Many physicists at the time would have scoffed at the idea that a mere clerk could contribute to science.

But Einstein wrote not one, not two, not three, but four groundbreaking papers that year on different themes, and they changed the way humans understood the universe.

It's just a myth that Einstein failed math

By the age of 15, I was already self-taught in calculus, and I also majored in mathematics and physics education at the Gymnasium in Munich — and did well at the Swiss Federal Institute of Technology.

But a lot of skipping classes, being in the lab, and not showing enough respect to my professors would lead me on the wrong track.

I couldn't even get a job as a lab assistant, so my friend's father persuaded me to get a job at the Swiss Patent Office.

While working six days a week as a patent clerk, I found time to study physics, discuss recent research with close friends, and publish papers.

And so, in March of 1905, it came as a big surprise to come up with a shocking hypothesis.

Despite decades of indications that light was a wave, Einstein showed that light could be a particle, and that his hypothesis could well explain mysterious phenomena like the photoelectric effect.

His ideas were ridiculed, but only because he was 20 years ahead of the rest of the world.

The particle-wave duality was the cornerstone of the quantum mechanical revolution.

Two months later, in May, Einstein submitted his second paper, this time challenging the centuries-old question: Do atoms really exist?

There had been theories based on the idea of ​​an invisible atom, but many eminent scientists saw the atom as nothing more than a useful fiction with no physical substance.

Einstein developed an ingenious argument to show that the random movement of small particles in liquids, called Brownian motion, can be accurately predicted by the collisions of millions of invisible atoms.

Einstein's model was soon experimentally proven, and even atomic skeptics gave in.

The third paper was published in June.

Einstein has long been troubled by the inconsistency between two basic principles of physics.

Relativity was an established principle dating back to Galileo, where absolute motion was indefinable.

On the other hand, the theory of electromagnetism, which was also well-established, held that absolute motion existed.

The inability to resolve this contradiction sent Einstein into what he called a state of mental tension.

But one day in May, after pondering this conundrum with my good friend Michele Besso, a light broke through the clouds.

I realized that time and space are relative to the observer, but if the speed of light is constant regardless of the frame of reference, then the contradiction can be resolved.

It took only a few weeks to formulate what would become known as the special theory of relativity.

Not only did this theory shatter our previous understanding of reality, it paved the way for technologies ranging from particle accelerators to GPS.

You might think that's enough, but in September, a fourth paper was written as an addendum to the paper on special relativity.

Thinking about his theory, Einstein realized that matter and energy, regardless of the difference between tangible and intangible, were in fact equivalent.

The relationship between the two can be expressed in a simple equation, and that's history's most important and famous equation, E = mc^2.

For the next 15 years, Einstein remained largely unknown.

He came to prominence because of his later general theory of relativity, which was substantiated by the curvature of starlight observed during the 1919 solar eclipse, and which received extensive media coverage.

But even if he later returned to the patent office and accomplished nothing, four papers in that miraculous year would have left Einstein remembered as an example of unexpected and astonishing genius.

In 2008, something amazing happened: one of the HIV patients was cured.

It's the first, and to date, the last, of the estimated 70 million people living with HIV.

We still don't know why this man made a full recovery.

Humanity has conquered many diseases, such as malaria and hepatitis C. So why can't we cure HIV?

I'm going to start by explaining how HIV infects people and causes AIDS.

HIV is transmitted through human bodily fluids.

The main routes of transmission are sexual intercourse without contraceptives and reusing syringes.

Luckily, it doesn't get transmitted through contact with air, water, handshakes, etc.

Anyone can be infected regardless of age, gender, sexual orientation, or race.

Viruses that enter the body act on cells that are part of the immune system.

They specifically target helper T cells, which are the cells that protect the body against bacterial and fungal infections.

HIV is a retrovirus that makes copies of itself by transcribing its own genetic information into the genome of the invading cell.

In the early stages of HIV infection, the virus replicates in helper T cells, destroying many cells.

At this stage, patients develop flu-like symptoms, but are generally not life threatening.

During the months and years of asymptomatic periods, patients may appear very healthy, but inside the body the virus continues to replicate and destroy T cells.

With your T cells depleted, you're at risk of life-threatening infections, opportunistic infections that you wouldn't get if you had a healthy immune system.

At this point, an HIV-infected person is a condition known as AIDS.

The good news is that we now have very effective treatments that can suppress the number of HIV viruses, stop the decline of T cells, and prevent the disease that progresses to AIDS.

Thanks to antiretroviral therapy, many people with HIV live longer, healthier lives and are less likely to infect others.

But there are two problems

One, people with HIV have to take this drug for the rest of their lives.

If you interrupt it, the dreaded virus will return.

What does this drug do?

The most common drugs interfere with the replication of the viral genome, preventing it from entering the host's DNA cells.

Other drugs stop the virus from growing and binding, preventing it from infecting new cells in the body.

But HIV hides in the DNA of healthy T cells, out of reach of our drugs.

Most T cells die after HIV infection

But there's a very small chance that the command that creates the HIV virus will go dormant, sometimes for years.

So even if you eliminate all the HIV virus from an infected person's body, it's still possible for the infected T cells to spring into action and cause the virus to emerge.

Another problem is that some people don't have access to medicines that can save their lives.

Sub-Saharan Africa is home to more than 70 percent of the world's HIV patients, but in 2012, only one in three people had access to antiretroviral drugs.

It will take time to resolve this issue

Political, economic and cultural barriers make effective prevention and treatment difficult

And even in the United States, more than 10,000 HIV-related deaths are reported each year.

I can still see the light of hope

Researchers are working hard to develop treatments like never before.

One study suggested a drug that would act on active cells that have taken up the HIV genetic information.

This allows us to destroy cells and bring viruses where current drugs can reach.

Another study looks at genetic means, trying to wipe HIV DNA out of the genome of a cell.

One out of 70 million patients will be cured, which is a staggering odds, but there's much more hope than zero.

We know it's a treatable disease, and we may be close to eradicating HIV.

This is the story of three empty and discarded plastic bottles.

Their journey is about to branch out, and the outcome will have as much impact as the fate of the planet.

but it wasn't always

To understand where the bottle ends, we first need to know about its birth.

The hero of this story is born in an oil refinery

The plastics that make up their bodies chemically combine oil and gas molecules to form monomers.

These monomers are then strung together to form long polymer chains that ultimately make millions of plastic pellets.

The pellets are melted in a manufacturing plant and molded in molds into a resilient material that makes up the body of the triplets.

After the machine fills the bottles with sweet sodas, the bottles are packed, shipped, purchased, opened, consumed and simply discarded.

Here they lie, quiet in a strange corner

Bottle 1 will end its life in a landfill along with billions of tons of plastic.

This gigantic landfill receives more garbage and continues to fill the space, expanding every day.

The plastic is crushed by layers of other debris, and rainwater flows through the debris, which absorbs water-soluble compounds in the container, some of which are highly toxic.

Together, they produce a toxic stew called leachate, which flows into groundwater, soil, and rivers, polluting ecosystems and threatening wildlife.

It will take 1000 years of anguish before Bottle 1 is decomposed.

Bottle 2's journey is stranger than Bottle 1, but unfortunately not happier.

By a small stream of water he reaches a stream, and the stream flows into a river, and then to the sea.

After months of wandering in the ocean, it is slowly drawn into a large vortex of garbage that is known as the Great Garbage Dump of the Pacific.

Here, ocean currents trap millions of plastic debris.

This is one of five plastic-filled gyres in the world's oceans.

This is where pollutants turn water into a murky soup of plastic.

Some animals, like seabirds, become entangled in this trash.

Animals mistake brightly colored plastic shards for food.

Plastic makes animals feel full when they're hungry, which causes them to starve to death and also passes plastic toxins up the food chain.

For example, if we are eaten by the nude spear, the sardine is eaten by the squid, the squid is eaten by the tuna, and the tuna is eaten by us.

Most plastics don't biodegrade, which means that plastics that are eaten are destined to become smaller pieces called microplastics that continue to circulate in the ocean forever.

But Bottle 3 escapes the terrible suffering of his other brothers.

A truck takes him to a factory, where he and his friends are squashed and compressed into blocks.

Sure, this sounds terrible too, but wait a minute.

get better later

The blocks are shredded into pieces, washed and melted, and they become raw materials that can be reused.

Bottle 3 magically transforms into something completely new.

A shard of plastic from humble origins suddenly opens up an infinite future.

In 1978, Louise Brown was the first to be born through in vitro fertilization (IVF).

Its birth revolutionized reproductive medicine.

Roughly 1 in 8 heterosexual couples have difficulty conceiving, same-sex couples and single parents need medical help to conceive, and demand for in vitro fertilization is on the rise.

Generalized, over 5 million babies were born.

In vitro fertilization is a technique that mimics the wonderful mechanism of sexual reproduction.

To understand IVF, we must first look at the natural process of pregnancy.

surprisingly it starts in the brain

About 15 days before fertilization is possible, the anterior pituitary gland secretes follicle-stimulating hormone (FSH), which causes the very few follicles in the ovary to mature and release estrogen.

Every follicle has one egg, and usually only one follicle matures.

As it grows and releases a sustained release of estrogen, this hormone not only prepares the uterus for growth and pregnancy, but also communicates the state of follicular development to the brain.

When estrogen levels rise sufficiently, the anterior pituitary gland rapidly increases the secretion of luteinizing hormone (LH), which triggers ovulation, causing the follicle to rupture and the egg to be released.

Once the egg is released from the ovary, it travels through the finger-shaped fimbriae into the fallopian tube.

If the egg doesn't meet and fertilize the sperm within 24 hours, the unfertilized egg dies and the whole system resets to prepare new egg cells and the endometrium for the next month.

The egg is the largest cell in the body and is protected by an outer shell called the zona pellucida, which is made up of sugars and proteins.

The zona pellucida prevents sperm, the smallest cells in the body, from entering and combining with more than one sperm.

It takes a man two to three months to make sperm, and the process is constantly renewed.

Ejaculation during intercourse releases more than 100 million sperm

About 100 eventually end up near the egg, and only one successfully penetrates the armor of the zona pellucida.

If fertilization is successful, the fertilized egg immediately begins developing into an embryo that reaches the uterus in about three days.

It takes about 3 more days to become firmly implanted in the uterine lining.

Once implanted, the cells that become the placenta secrete hormones that signal the post-ovulatory follicle of pregnancy in the uterus.

It also prevents the loss of the follicle, now called the corpus luteum, during this period of the normal menstrual cycle.

The corpus luteum produces progesterone, which is necessary for the continuation of pregnancy up to 6-7 weeks of gestation, after which the placenta develops and secretes progesterone until about 40 weeks of delivery.

How does in vitro fertilization work

When a patient undergoes in vitro fertilization, he or she is given higher-than-natural concentrations of follicle-stimulating hormone (FSH), which causes ovarian hyperstimulation, which ultimately produces multiple egg cells.

Just before ovulation is due, the eggs are harvested.The woman is anesthetized, guided by an ultrasound machine, and retrieved using an aspiration needle.

Most semen collection is by masturbation.

In the laboratory, the selected eggs are stripped of their surrounding cells and prepared for fertilization in petri dishes.

Fertilization takes place in one of two ways

The first is by incubating the egg with thousands of sperm and allowing them to fertilize naturally within hours.

The second method maximizes the certainty of fertilization, using a needle to inject a single sperm into the egg.

This method is especially useful when sperm quality is compromised.

After fertilization, the embryos are either subjected to preimplantation genetic screening, frozen and prepared for later pregnancies, or implanted into the uterus using a catheter.

Usually, the embryo is transferred either at the 8-cell stage, three days after fertilization, or at a stage called the blastocyst, which consists of hundreds of cells, five days after fertilization.

Donor eggs may also be used if the quality of the egg is poor due to age or exposure to toxins, or if the egg has been removed due to cancer.

If the mother-to-be has a uterine defect or no uterus at all, a third-party woman, called a surrogate mother or surrogate mother, can carry out the pregnancy in her womb.

To increase the success rate, which is 40 percent of the pregnancies in women under the age of 35, we sometimes transfer more than one embryo at a time, which is why IVF results in more twins and triplets than natural pregnancies.

But many clinics are trying to minimize multiple pregnancies, which are dangerous for both mother and baby.

Like Louise Brown, millions of babies are born through IVF and live normal, healthy lives.

The long-term health consequences of ovarian stimulation during IVF are unclear, but to date, IVF is considered safe for women.

With advances in genetic testing, late births, and declining availability and cost, it is not impossible that artificial conception through in vitro fertilization and related technologies will surpass natural reproduction in the future.

A thumping sound that goes on without a break at my feet Limited space And I'm not going anywhere Indifferently fast monotony

It feels like hours have passed, but it's only been 11 minutes, and you're thinking, "Why am I hurting myself?

Isn't this a cruel and unusual punishment?"

In fact, it was so.

In the 19th century, the treadmill was invented to punish British prisoners.

At the time, the British prison system was terribly unhelpful.

Executions and deportations were rampant, and those incarcerated endured hours of solitude in dirty cells.

So religious groups, charities, and celebrities like Charles Dickens tried to change this dire situation and help prisoners rehabilitate.

Once the movement was successful, the prison was completely rebuilt and new rehabilitation modalities were introduced, like the treadmill.

This is the first treadmill, invented in 1818 by an English engineer, Sir William Cubitt.

Inmates step 24 steps on big wheels.

As the wheel spins, the inmate either keeps climbing the steps or risks missing, like a modern step-climbing exercise device.

On the other hand, the rotation of the wheels powered water pumps, ground grain, and powered mills, hence the name "treadmill."

The device was hailed as a great way to rehabilitate prisoners, and the advantage of powering mills helped rebuild Britain's economy, which had been devastated by the Napoleonic Wars.

It's been to the benefit of everyone involved - except the prisoners.

It's estimated that, on average, inmates spent about six hours a day on the treadmill, which is equivalent to climbing distances between 1,500 and 4,200 meters.

4,200m is half the distance to climb Mount Everest.

Think of this as a poor diet for five days a week.

Cubitt's ideas quickly spread throughout the British Empire and America.

In the decade since its invention, over 50 prisons in the UK have adopted treadmills, and so has the United States.

Naturally, the strenuous exercise and malnutrition weakened and injured many prisoners, but the guards didn't seem to care.

In 1824, James Hardy, a New York jailer, credited this device with making even the most violent prisoners docile, saying, "Fear comes not from its severity, but from its monotony and consistency."

Treadmills were used in England until the late 19th century, when the Prisons Act of 1898 banned them for being too cruel.

But the device returns with a vengeance, this time targeting the unsuspecting public.

The treadmill was patented in the United States in 1911, and by 1952, the precursor to the modern treadmill had been developed.

When the jogging boom hit America in the 1970s, the treadmill was once again in the spotlight of the world, touted as an easy and convenient way to get aerobic exercise and lose weight.

Since then, the popularity of this machine has not waned.

The next time you jump onto something that was once used as a ruthless and insane punishment, why not be happy that you're free to get off at any time?

If you watch the news or are interested in politics, you may have heard the term "Orwellian" used in many different contexts.

But have you ever stopped to think about what this word really means and why it's used so often?

The term is named after an English author named Eric Blair, who is known by the pseudonym of George Orwell.

His most famous work, the novel 1984, depicts an oppressed society under a totalitarian government, and the word "Orwellian" is often used to describe authoritarianism.

But such usage not only fails to fully convey Orwell's message, it even exemplifies what Orwell sounded the alarm bells.

Orwell opposed all dictatorships and spent most of his life fighting anti-democratic movements on the left and right.

But what he was deeply concerned about was how these ideologies spread.

One of his most profound ideas is the importance of language in shaping our thoughts and opinions.

1984 is set in some obvious ways that governments in Oceania regulate what people do and what they say.

Every move and every word is monitored, and the terrible fate that awaits those who cross the line is always raising people's heads.

Another method of regulation is not so obvious.

People are constantly being shown historical facts, statistics, and other propaganda fabricated by the "Ministry of Truth."

"Ministry of Peace" means the military

Concentration camps are called "joy camps"

Political prisoners are detained and tortured by the Ministry of Love.

This deliberate sarcasm is a good example of "doublespeak," where words are used not to indicate meaning, but to undermine it, corrupting the very notion of meaning.

This regime's control of speech went even further, erasing words from the English language to create a new official language, "Newspeak," a very crude language consisting only of abbreviations and simple concrete nouns, lacking a complex enough vocabulary to express subtle meanings and critical thoughts.

This affects a mental state called "doublethink." It's a state of hypnotic cognitive disharmony that causes an individual to believe an officially-imposed narrative about an event contrary to his or her perception of it, leaving the individual entirely dependent on government-defined reality.

The result is a world in which even the privacy of thought processes is violated, where just talking anti-social things in your sleep can get you guilty, keeping a diary or making love can be considered treason.

While this may seem like it can happen only in totalitarian regimes, Orwell warns that it can happen in democratic societies as well.

That's why "Orwellian" doesn't just mean "authoritarian."

In his essay "Politics and the English Language," he describes writing techniques that use pompous language to show authority, and euphemisms and complex sentence structures that make brutality more acceptable.

But even the misuse of even plainer language affects the way we think.

The words you see and hear in advertisements every day are designed to speak to you and influence your actions, in the same way that soundbites and political campaign pitches convey few nuances about issues.

We use well-worn phrases and answers that we've heard in the media or found on the Internet because it's easy to do without thinking too hard or rethinking our thinking.

Next time you hear the term "Orwellian," pay close attention.

If you're talking about using language to deceive and manipulate people, you're using it correctly.

If you're talking about governments that exercise mass surveillance and intervention, they're authoritarian, but they're not necessarily Orwellian.

If you use anything and everything to qualify an idea you don't like, the discourse itself may be more "Orwellian" than the object of criticism.

Words have the power to shape thoughts

Language is a tool for expressing politics, and it forms the foundation of society, from the most mundane of everyday interactions to lofty ideals.

Orwell urges us to defend our language, because ultimately our ability to think and communicate clearly is what protects us from a world where war represents peace and freedom represents forced labour.

Well, I do research outside of physics.

To tell you the truth, I mostly do things other than physics now.

One of them is about the old relationship of human language.

Historical linguistics specialists in the United States and Western Europe have mostly

We try to avoid any archaic relationships, such as large divisions between languages, or divisions that predate language families in use today. I don't like that kind of thinking.

I think it's a wild idea. I do not think so.

But there are some wonderful linguists, mostly Russians, doing this work in the Santa Fe Institute and in Moscow. I would very much like to see the outcome of that research.

Can we really arrive at one proto-language that existed 20,000 or 25,000 years ago?

And what if we go even further back in time than the proto-language, when it is believed that there was competition from other languages?

How long ago was that? How far back can modern languages ​​go?

How many thousands of years ago?

Chris Anderson: Any hunches or hopes for that answer?

Murray Gell-Mann: Well, I think modern language must be as old as, or even older than, cave paintings, sculptures and statues in Western Europe, and dance steps carved into soft clay during the Aurignacian culture some 35,000 years ago.

Having done all that, it's hard to believe that we didn't have a modern language.

So I think the actual origin is that old or maybe even older.

But that probably doesn't mean that the ancestry of all, many, or even most modern languages ​​goes back, say, 20,000 years or more. We call it the bottle neck.

Chris Anderson: Maybe Philip Anderson was right.

Maybe you just know everything better than anyone else.

Thank you for your wonderful story. It was Murray Gelman.

(audience applause)

Let's do a thought experiment

In the not-too-distant future, I was driving a self-driving car at high speed down a highway, and I found myself surrounded.

Suddenly, a large, heavy package fell from the bed of the truck in front of me.

You can't avoid a collision by hitting the brakes. You have to make a quick decision: do you want to go straight ahead and run into the load, dodge left and hit the SUV, or dodge right and hit the bike?

Should I give top priority to my safety and hit a motorcycle? Even if it means colliding with a big object and sacrificing my life, should I give priority to the safety of people and go straight ahead?

Which self-driving car should you choose?

Under these circumstances, if a person was manually driving a car, any reaction would be perceived as a mere reflex rather than a deliberate decision.

It was an instinctive act in a state of panic, and there was no premeditation or malice.

But if that same behavior were pre-programmed into the car by a programmer as a reaction to a possible future situation, it would look more like premeditated murder.

In all fairness, self-driving cars are expected to dramatically reduce traffic accidents and fatalities by removing human error from driving.

There are many other benefits, such as reducing congestion on the roads, reducing harmful emissions, and minimizing the amount of time humans spend in unproductive and stressful driving.

But accidents can still happen, and when they do happen, the consequences may have been determined months or years in advance by programmers and policy makers.

And some of those decisions must be difficult.

Fundamentally, decisions may be made on the basis of general principles like "minimize harm," but there will still be situations where ethically opaque decisions will have to be made.

For example, let's say we were in the same situation as before, but this time there was a motorcycle with a helmet on the left, and a motorcycle without a helmet on the right.

Which way should a self-driving car steer?

If we hit people with helmets because they have a better chance of survival, wouldn't we be punishing those who follow the rules?

On the other hand, if you hit a bike that doesn't follow the rules and doesn't wear a helmet, you're violating the design principle of minimizing harm, and you're leaving it up to the robot car to decide what's fair on the road.

Ethical considerations can be even more complicated.

In both scenarios, the design policy acts as a goal selection algorithm.

In other words, it's systematically choosing what it prefers to collide with.

And the occupants of the targeted vehicles, though not at fault themselves, will take on the negative consequences of the algorithm's choices.

This new technology creates many other new kinds of ethical dilemmas.

For example, if you had to choose between a car that tries to save as many lives as possible in an accident, or a car that prioritizes the safety of its occupants above all else, which would you buy?

What if cars were able to analyze and take into account who the people were and what the circumstances were?

Is there a case where a quick decision on the fly is better than a pre-designed decision to minimize harm?

Who should make those decisions anyway?

are you a programmer

Are you a car company?

Government?

Reality doesn't always play out like these thought experiments, but that's not the point.

The role of these thought experiments, much like scientific experiments in the physical world, is to take our ethical intuitions and put them to the stress test.

By identifying these ethical hairpin curves now, we can navigate the unknown roads of tech ethics and navigate confidently and conscientiously into a brighter future.

This talk contains adult language Please use your discretion.

I wrote a book about civility, and since that book came out right around the time of the 2016 US presidential election, I got a lot of requests to talk about why civility is especially important to us.

that was good

But there was a problem, the reason I wrote about civility was that it was a hoax.

because I was convinced

(Laughter) I know that sounds pretty rude, but fortunately for you and the publisher, I changed my mind in the end.

Because as I researched the history of civility and religious tolerance in the 17th century to write this book, I realized the benefits of civility. It's not just a phony, it's absolutely essential for a society that is tolerant of diversity. For a society that is as diverse as it is today, a society that not only guarantees freedom of speech, but also the disagreements that arise from diversity and even the sometimes hostile conflicts that arise.

There's a reason the adjective for "Disagreement" is "Disagreeable"

Because, as the English philosopher Thomas Hobbes said in 1642, simply having a different opinion offends people.

Hobbes' point is still valid today. For example, if you disagree with someone and say, "I'm right because I'm always right," can you prove them wrong?

Could it be that the other person just gave it some serious thought and came to a different conclusion?

No, the other party must be plotting something, or they're stupid, bigoted, and have ulterior motives.

maybe i'm crazy

But the other person thinks so too, right?

So the mere fact of disagreement is implicitly an insult to one's views and intelligence.

And when the disagreement is about fundamental issues, such as worldviews and self-perceptions, things get even worse.

you know what the conflict is

You don't discuss religion or politics or trends in popular culture at your dinner table because you disagree.

But these fundamental disagreements are exactly what diversity-tolerant societies like the United States are proposing to embrace, and this may explain why, at least historically, tolerant societies are not so optimistic.

People in such a society despise each other, but somehow they manage to endure it.

That's what I've learned from studying modern British and American religious tolerance.

I also learned that what allows people to live together without killing each other is the virtue of civility. Civility makes disagreements tolerable, so it allows us to live together even if we don't agree with each other on beliefs, political issues, or whatever.

And yet, I hear quite a lot of people talking about civility, and I really hear it here and there, but they seem to mistake it for something else.

If civility is a virtue that allows us to tolerate disagreements so that we can interact with those who disagree, then "preaching civility" seems largely a strategy of abandoning debate.

It's like picking up the ball and threatening to go home when you're on the verge of losing a game.

The funny thing is, when we say "lack of civility," it's always the other side that's at fault.

it's a strange story

You can suddenly forget what you said about your bad behavior, or you can justify it as a legitimate response to what the offended person said.

"How can I be polite to someone who tries to deny all my opinions?

That's where it started in the first place."

This is a very convenient story

Conveniently, when you ask most civility theorists what civility really is, they're vague and vague.

People say that civility is simply synonymous with "respect," "good manners," and "politeness," but on the other hand, accusing someone of lacking civility is far worse than saying that they're rude, because someone who lacks civility is more intolerable than just being rude.

So when you accuse someone of having no civility, you're saying to them, "You're beyond my tolerance and not even worth discussing."

Here, civility is not a hoax, it's worth it, because its virtues not only enable fundamental disagreements, but even make them fruitful.

It's worth it, but it's also very difficult.

On the other hand, "preaching civility" is very easy, yes it's easy, and most of the time it's sheer nonsense.

(Laughter) We tend to forget that, as politicians and intellectuals have warned for decades, the United States is on the verge of losing its civility.

But historians say that there is no such thing as a golden age of disagreement in history.

In my book, I pointed out that the first crisis of civility in modern times began about 500 years ago, when a theologian named Martin Luther used the most advanced communication technology of the day, the printing press, to accuse the pope of the time of being the antichrist, and inadvertently the Protestant Reformation happened.

Think of the printing presses of the time as 16th-century Twitter, and Martin Luther was the original troll.

I am not exaggerating

He said he couldn't pray to God without cursing Catholics for being "anti-Christian."

And, of course, Catholics were stunned and demanded civility, but even with that said, they began to use the old swear word "infidel," and in the 16th century, the derogatory term "Protestant."

What's interesting about the civility debate, both past and present, is that by accusing your opponent of being lowly and claiming you're morally high, you're either as good or worse than your opponent, because the person who makes the civility claim that he or she is a model of decency, while accusing the "brazen" who implicitly dissents of immorality.

That's why 17th-century civility theory was an effective way for members of the Anglican Church to silence, suppress, and eliminate dissidents who spoke out against the status quo.

An Anglican clergy, for example, might tell an atheist that their arguments are filthy.

Or, for example, they might accuse Quakers of not taking off their hats when they should, or of rude handshakes.

But such disrespectful accusations quickly lead to persecution.

It's a pattern you hear often.

I often see this way

It was used in the 20th century to stifle the civil rights movement.

And I think that's why, I think, this is why both sides fall into this pattern of brandishing this blatantly outdated early-modern term (civility) whenever they want to tell you that a particular person or point of view is out of their grasp and at the same time they want to move away from a nasty argument.

That's why skeptics like me think that when the topic of ill-considered "virtue" begins, it's started again, because when we talk about civility, we feel that instead of bridging socio-political gaps, we're exacerbating them.

Preaching civility is about avoiding the hassle of arguing, and showing people where you stand by telling people what you're saying, ignoring what they're saying, or ignoring what they're saying, while signaling to each other that your opinion is superior.

That's why I think that since a lot of civility theories are nonsense, even if you think that the virtue of civility itself should be nonsense, you'll be forgiven.

But also a historical perspective helps

Because the modern crisis of civility that gave rise to the Reformation also gave birth to tolerant societies, places like Rhode Island, Pennsylvania and, ultimately, the United States, which at least aim to guarantee disagreement and diversity. The virtue of civility has done this.

This has allowed us to tolerate disagreements and coexistence, even if our beliefs were different. But I think its virtue is more passive and more confrontational than what people preach about civility today tend to embrace.

That's why I call such virtues "minimum civility."

Virtue can help you get along, for example, with an ex-spouse, or a troublesome neighbor, or someone from a different party.

Minimal civility is reluctantly the minimum of good manners. But it also makes sense, because civility is a virtue that helps us hold disagreements. As Hobbes said hundreds of years ago, disagreements are unpleasant for a reason.

If not phony, what is civility or "minimum civility"?

What elements are there?

First of all, civility is not synonymous with respect or politeness, because civility is exactly what you need when you're trying to get along with people who are difficult or impossible to respect.

And civility isn't synonymous with being a good person, because being a good person doesn't tell someone to their face what they really think or if their opinion is wrong.

But civility is telling your true feelings, and that's to the person with the dissenting opinion, not sneaking around behind your back.

"Minimum civility" doesn't mean softening your words, but at the same time, perhaps you could also say that it's about stating dissenting opinions in bits and pieces, because "minimum civility" is about holding on to different opinions, even if we have radically different opinions, without denying or destroying the possibility of coexisting with people who get in the way of us.

In this sense, civility is also closer to another virtue, courage.

"Minimum civility" means being able to have the courage to disagree and stay where you are, while still being able to do so while staying in the same place and facing those with whom you disagree.

At this point, saying "nonsense!" to "civility theory" may be the only civilized act.

at least i think so

If there's one thing I've learned from the long history of religious tolerance in the 17th century, it's this: If you're using your references to civility as a way to avoid controversy, or if you're using it as a way to get together only with people who agree with you on an opinion that's similar to yours, or if you find yourself never having a conversation with someone whose opinion is radically different from yours, then you're mistaking civility.

thank you

(applause)

When the sun's UV rays hit your skin, everyone reacts differently.

Depending on the color of your skin, some people may turn red after just a few minutes of exposure, while others may take hours to see a reaction.

What causes this difference? Why does human skin have so many different shades in the first place?

Every skin color holds an epic tale of human bravery and adaptability, showing us that it's the biological processes that make the difference in skin color.

At its core is melanin, the pigment that gives skin and hair color.

Melanin is produced by skin cells called melanocytes, and there are basically two types.

One is called eumelanin, which determines the degree of brownness in skin and the lightness of hair, such as black, brown, or blonde.

But humans haven't always been like this.

Different skin tones arose in the course of human evolution, and the reason is the sun.

About 50,000 years ago, our ancestors migrated north from Africa and settled in Europe and Asia.

Because these ancient humans lived between the equator and the Tropic of Cancer, they were exposed to a lot of UV light.

Prolonged exposure of the skin to UV light damages the DNA in the cells and causes tanning.

When this damage becomes too much, the cells mutate, and melanoma, a deadly skin cancer, develops from the melanocytes.

Sunscreen as we know it today didn't exist 50,000 years ago.

So how did our ancestors cope with the relentless UV rays?

The key to survival was our own sunscreen, melanin produced under the skin.

The type and amount of melanin in a person's skin determines how much it protects them from the sun.

It's the skin's reaction to the sun's rays.

When melanocytes are exposed to UV light, they trigger the production of melanin, which acts on a light-sensitive receptor called rhodopsin to protect the cell from damage.

This is how fair people produce more melanin, darken their skin, and tan.

Over the course of generations, in parts of Africa, especially in the sunnier areas, they adapted to their environment with higher melanogenesis thresholds, more eumelanin, and darker skin.

Innate sunscreens ward off melanoma, improve adaptability and survival, and make it easier to pass on this useful trait to the next generation.

Thus, the ancient humans adapted to the sun left the tropics and migrated northward, spreading across the globe.

But the further north you go, the less direct sunlight you get.

This was a problem, because while UV rays can damage the skin, they also provide important benefits.

Ultraviolet rays help the production of vitamin D, which strengthens bones and promotes the absorption of important minerals such as calcium, iron, magnesium, phosphorus, and zinc.

A lack of vitamin D can lead to severe fatigue, weak bones, and diseases such as rickets.

Humans, whose dark skin had consequently shielded them from the sun's rays, faced the serious problem of vitamin D deficiency in the north.

But some people had less melanin.

They didn't get enough sunlight to cause melanoma, and the lighter skin was better at absorbing UV light.

Thanks to vitamin D, these people have strong bones, survive well, and have healthy offspring.

After generations of natural selection, the skin gradually turned white in these areas.

As a result of this adaptation of our ancestors to the environment, the world today is filled with a wide variety of skin tones. In general, darker skin is eumelanin-rich near the equator where the sun is abundant and hot.

So skin color is more than just an adaptation to live on the "stone" that revolves around the sun.

Finally, your skin reflects and absorbs light, but it doesn't "reflect" your personality.

Long before the advent of selfies, ancient Greek and Roman mythology told stories of men who were a little too obsessed with their appearance.

This is how a handsome man named Narcissus was wandering in search of a true lover.

After rejecting the courtship of a fairy named Echo, he fell in love at first sight with his own reflection in the river.

Unable to leave the scene, Narcissus drowned.

The flower that grew where he died is called Narcissus.

This myth captures the basic concept of narcissism, an uplifting and sometimes toxic self-absorption.

But it's not just a type of personality, as people say in life advice columns.

It's a set of traits that are well studied by psychologists.

In psychology, self-love is having an exalted, grandiose self-image.

To varying degrees, narcissistic people believe that they are cooler, smarter, more important than other people, and that they deserve special treatment.

Psychologists divide narcissism into two personality types: grandiose and vulnerable.

There's also something called "narcissistic personality disorder," which is a more pronounced type, but I'll come back to that later.

Grandiose narcissism is one of the most familiar traits: extroverted, dominant, and attention-seeking.

People with the Grandiose Narcissistic trait seek attention and power, whether they're politicians, celebrities, or cultural leaders.

Of course, not all people seeking positions of power are narcissistic.

For many of us, it's for very positive reasons, like making the most of our talents or making people's lives better.

But narcissistic people seek power because it gives them social status and attention.

On the other hand, people with vulnerable narcissistic traits tend to be quiet and reserved.

They have a strong sense of entitlement, but they are easily intimidated and hurt.

The harmful effects of both types of self-love manifest themselves as long-term effects.

Because narcissistic people tend to act selfishly, narcissistic leaders may make risky or unethical decisions, and narcissistic partners may be dishonest or dishonest.

We can become rebellious and aggressive when our optimism about ourselves is threatened.

You could say that with this disease, the person is in a good mood and the people around them suffer.

In extreme cases, these behaviors are called narcissistic personality disorder, a psychological disorder.

Affects 1-2% of the population, more common in men

And this diagnosis is made in adults.

Young people, especially children, can be very selfish, but sometimes it's just part of normal development.

The DSM-5 Diagnostic and Statistical Manual of Mental Disorders The DSM-5 Diagnostic and Statistical Manual of Mental Disorders describes several characteristics associated with Narcissistic Personality Disorder.

Exaggerated view of self Problems with empathy Feeling of entitlement Desire for admiration and attention

Based on these characteristics, the criteria for diagnosing a personality disorder are whether it dominates other people's lives and causes serious problems.

Think about it, instead of cherishing your spouse and children, you continue to seek their attention and admiration.

Or instead of asking for constructive feedback on what you've done, you keep telling everyone you're doing something wrong that they're trying to help you.

So how do narcissistic traits come about?

Twin studies show a strong genetic component, but we don't know which genes are involved.

But the environment matters too.

Parents who treat their children reverently may promote grandiose narcissism.

And cold, controlling parents may promote vulnerable narcissism.

And narcissistic people are more prevalent in cultures that value individuality and self-promotion.

For example, in the United States, narcissistic personalities have been on the rise since the 1970s, when the '60s focus on community gave way to an emphasis on self-esteem and the rise of materialism.

More recently, social media has made self-promotion many times easier, although there's no clear evidence that social media produces narcissistic traits.

Rather, it's a way for narcissistic people to gain social status and attention.

So can narcissistic people improve their unwanted traits?

can!

Anything that encourages honest reflection on one's own behavior and concern for others, such as psychotherapy or efforts to empathize with others, can be beneficial.

The problem is that people with Narcissistic Personality Disorder find it difficult to keep working on self-improvement.

Self-reflection without flattery is difficult for narcissistic people.

I'd like to talk to you today about micromanagement, and I'd like to share with you what I've learned about micromanagement over the last few years as a micromanager myself.

What exactly is micromanagement?

How can you define

If you ask me, it's to bring together bright, creative people -- people like you -- into a system, and then gut them.

Has anyone in human history ever said that?

"That's why this contract definitely couldn't be written in Mincho typeface because you insisted it was in Gothic typeface. Look.

Hundreds of millions of yen money is paa

The typeface was the only problem."

There's nothing like this, right?

Sometimes you can feel the physical effects of being micromanaged.

remember the most exhausting time in your life

Maybe it wasn't when you worked late into the night, or when you got home from a business trip, but rather when someone was looking over your shoulder watching your every move.

Like when your mother-in-law comes over?

(Laughs) It's like, "I already know."

In fact, there is data to back this up.

In a recent British study

We had 100 hospital workers wear activity trackers and each perform a 12-hour shift -- a normal 12-hour shift.

After my shift was over, I asked him if he was tired.

I found it very interesting

The people who felt the most tired weren't necessarily the ones who were moving around the most, they were the ones who had less control over their work.

So why do we micromanage when we know it's not very effective?

Was the definition wrong?

I said earlier that micromanaging is about recruiting smart, creative people and then emasculating them. Maybe what we really want to hire is -- seriously -- stupid, uninventive people?

It's a no-brainer

It's like "Do you want your luggage stolen at the airport?"

The answer would be no, but I've never been asked

Has anyone ever asked you, a manager, this question? "Would you like to hire someone stupid and unoriginal?"

This is TED, so we need data to back it up.

I actually asked hundreds of people across the country, and I asked hundreds of managers across the country if they wanted to hire stupid, unoriginal people.

Interesting question though

The results are also interesting

Ninety-four percent said no -- (Laughter) you don't want to hire someone who's stupid and unoriginal.

The other 6% probably didn't understand the question. (Laughter) But good luck to them.

So if 94% of people say no, why micromanage?

And I think the answer is pretty simple, and I think it's something that we all know, deep down, and have actually felt.

When you're hired by an organization, whether it's a club, or a law firm, or a school system, or whatever, you don't suddenly jump to the top of the pecking order.

start at the bottom

what do you do in

It is the job

You work, right?

If the job is really good, what are you waiting for?

More work?

As expected, everyone is a good practitioner of micromanagement.

(Laughter) If you do more work, and do it well, you'll soon be managing the people doing the work, although you'll still be doing a little bit of the work.

And if that goes well, what happens next?

You start managing people who manage people doing the work, and at that point you start to lose control over your performance.

I have personally experienced

I started a company called Boxed in my garage, right here, it's a nondescript place with a pressure washer in the back -- I was just "living the dream."

When I started my business, my wife was very proud of me, or at least that's what she said -- as she hugged me, she looked at her phone and thought, "Is John from Harvard still single?"

The company was little more than a children's refreshment stand, but it got off to a good start, and we thought, "Mobile commerce is on the rise, and in fact, consumer products are gradually changing. Bulky, bulk products that are hard to bring home -- 24 packs of cookies instead of 2, 48 rolls of toilet paper instead of 24. Let's get what's available in the big discount membership stores, and get it delivered to your door."

this is what we did

But my printer is slow and it's taking so long

While I was waiting, I decided to handwrite a few words to please the customer on the back of the invoice.

For example, "Keep smiling"

"You're the best." "Enjoy your snacks." "This sports drink is good."

I wrote that

And this started to make my job less monotonous. At the time, I was doing all the picking and packing, and when I was in the garage, I was doing it eight to 12 hours a day.

Then something interesting happened

the company started to grow

In just 36 months, we've reached hundreds of millions of dollars in sales, and we're growing faster and faster.

In the meantime, my role has also changed.

Yes, back in the garage, I was the CEO, but I did the picking and packing and all the hands-on stuff, but when I graduated from that, I was managing the pickers and packing people, and very quickly I was managing the people who were managing the pickers and packing people.

I still manage the chief executives who manage the department that manages the pickers and packers.

And this time I lost control

We were delighting our customers with a little note.

You liked it, but I can't write it anymore, so what should I do?

I will instruct the person in charge how to write the memo.

Indicate the type and color of the pen, the content to be written, the size of the letters, and even the line spacing.

So instead of trying to make the job of the distribution center less monotonous and boost morale, it turned into micromanagement, and people started complaining about HR.

"This CEO keeps interjecting

I know how to write notes."

(Laughter) So that's when I did this.

Now that you've hired such a smart and wonderful person, all you have to do is give them a mission to "delight your customers," and give them the tools to make it happen.

The results were quite astonishing

Some people have started to draw very ornate murals in their notebooks.

When you order diapers, you'll get a funny note that says, "Hello baby!"

And when the next order goes up in size, I write, "You're getting bigger!"

Now everyone is obsessed

But there were times when I went too far.

There was a person who always wrote only "Thank you." It seems that the boss was the one who always wrote only "Thank you."

On the other hand, something interesting also happened

I got too creative

As I said, everything is sold in bulk here: tons of diapers, tons of toilet paper, tons of snacks and cookies.

Contraceptives are also sold in bulk.

(Laughter) We sell condoms in units of 40.

You're adults, so 40 condoms.

So, one person ordered four boxes of 40 condoms. (Laughter) And that's all they ordered, 160 condoms.

(Laughter) This guy-

I wrote, "Optimism, great." (Laughter) (Applause) We weren't sure if he was fired or promoted, but he still works here.

"Optimism is the best"

But when I go a little overboard like this, it makes me feel a little conflicted.

So— [CONFLIC] Big typo on slide? [CONFLIC] No, there's a red word "TED" on this side of the stage, so it's not a typo, is it?

(Laughter) (Applause) You have a terrible sense of humor, but you seem to be wearing shame.

So I have very complicated feelings

At the time, we were doing something out of the ordinary, and that's where the failure happened.

So I thought, is it okay to let it fail?

Should I leave it as is?

I don't know -- I didn't know it at the time, but it made me think, Is failure really that bad?

I'm not saying you should celebrate failure.

In Silicon Valley, there's a tendency to celebrate failure.

I doubt everyone should go that far, because no one at a board meeting is going to say, "You screwed up last year, and you're going to keep doing this next time!"

no need to say

If there is an organization that would make such a statement, please contact me and I would love to attend the conference.

In my personal life, I don't think many people enjoy failure, but failure is essential in the long run to anyone who's smart, imaginative, and truly committed to completing the mission they've been given.

So failure is a milestone on the way to mission success.

If the downside of not micromanaging, as it's often said, is more failures, if that's not so bad, what's the upside?

The benefits we experienced were amazing

We asked our engineers, "My distribution center cost millions of dollars to build, but inside it's a long conveyor belt. Can we do the same thing more efficiently, but without spending millions of dollars?"

So the technician went to work. This is not an image, it's an actual photograph.

What they built is an autonomous guided vehicle.

You didn't tell me what to build or what format I needed.

Ninety days later, we had the first prototype, powered by a Tesla battery, equipped with a stereoscopic camera, a lidar system.

It's just as efficient as a conveyor belt, but it doesn't require as much capital investment as a conveyor belt.

And this wasn't limited to engineers.

Even in the marketing department, when I told them, "Tell everyone to try what they think is good."

Marketing talent Natasha

He stopped me one morning and said, "Should we do something about the pink tax?"

I sat down with my coffee and asked, "What's the pink tax?"

Interestingly, I was told

In fact, 32 states in the United States impose a luxury tax on products aimed at women.

I can't call my wife, but when she called me and said, "Buy me a napkin on the way home," I said, "Hey, we're in the middle of a trade war right now, and the economy isn't doing very well, so there won't be any luxuries this month. Next month, I'll definitely -- (laughs) I'll take a look."

If you give it back, you'll get divorced right away.

But what's really interesting -- I didn't tell them to do anything -- they've started working with the finance department to give customers all over the country a discount on the taxes that they have to unfairly collect.

By now you might be thinking, "What are the real benefits of not micromanaging?"

It's- I didn't do anything

I made an unmanned guided vehicle

I wasn't the one who launched the anti-pink tax campaign.

I didn't do anything, but I'm taking credit for it and now I'm on the TED stage.

(laughs)

Are you really the CEO?

(Laughter) No, it's actually like this.

I don't know if I've really learned to be a CEO, but I learned the most fundamentally challenging thing I've ever learned, which is --

There's only one way to solve micromanagement

is to trust

thank you

(applause)

In the third act of Swan Lake, the black swan pulls off a series of seemingly endless turns, hopping on and off his toes, spinning, spinning, spinning 32 times.

It's one of the most difficult sequences in ballet, and for a little over 30 seconds, the black swan looks like a human top spinning forever.

This spectacular turn is called a "fette", which is French for "whip, whip" and illustrates the dancer's uncanny ability to keep spinning like a whisk.

But it's okay to admire Fette, but can we figure this out physically?

In the fette, one foot is kicked out to create "torque".

The hard part is maintaining the rotation.

As you spin, there's friction between your toes and the floor, and there's a little bit of resistance between your body and the air, slowing your spin.

So how do you keep spinning?

And between turns, there's a momentary pause and you turn to face the audience.

After your pivot foot hits the floor, you twist back to tiptoe, this time pushing against the floor to create a small amount of "torque."

At the same time, swing your arms out to keep your balance.

Turns are most efficient when the center of gravity is stable, and good people can keep the axis of rotation vertical.

Both the outstretched arms and the torque-producing pivot legs create the foette's momentum.

But the real secret of Fette, and the reason why it's barely noticeable when it stops, is that its other leg keeps moving all the time.

While the rotation stops for a split second, extend the leg that was in the air, move it from front to side, and then close the knee again.

These legs that keep moving hold some of the momentum of the rotation.

When the lifted leg returns toward the body axis, the retained momentum is transferred back to the body and joins the rotation as it returns to tiptoeing.

By opening and closing your legs with each turn, the momentum of the rotation bounces back and forth between your legs and your body, keeping you spinning.

If you're really good at it, you can do two or more rotations with each leg extension. There are two ways to do it.

The first is to stretch your legs early

The longer your leg stays extended, the more momentum you store and the more momentum you can transfer to your body when you pull your leg in.

With more "angular momentum," it can turn more before the momentum lost to friction runs out.

Another way is to bring your arms and legs closer to your body when you're back on your toes, and bring your arms and legs closer to your body when you're back on your toes

I wonder why?

Like other turns in ballet, the fette is dominated by angular momentum: Angular Momentum = Angular Velocity x Moment of Inertia.

Aside from the loss of friction, angular momentum remains constant while you're on your toes.

This is called the law of conservation of angular momentum.

Moment of inertia is best thought of as the object's resistance to rotational motion.

It increases when the mass is distributed farther from the axis of rotation and decreases when the mass is distributed closer to the axis of rotation.

So the closer you pull your arm to your body, the less the moment of inertia.

Angular momentum is conserved, so the "angular velocity," or speed of the turn, must increase. This is why it can continue to make multiple turns with the same accumulated rotational momentum.

You've probably seen something similar in figure skating, where you pull your arms and legs together to spin faster and faster.

In Tchaikovsky's ballet, the black swan is the witch, and the dazzling, captivating 32-turn fette is hardly human.

But it's not magic that makes it possible.

it's physics

The tyrant who broke with the Roman Church and changed the course of British history forever.

A charismatic reformer or an oppressive tyrant?

It's the opening of the trial of history v. Henry VIII.

(Presiding Judge) Be quiet, be quiet

(Defense Counsel) Well, the Chief Justice, the virtuous King Henry VIII, the man who reformed Britain's religion and politics and paved the way for the modern nation.

(Prosecutor) Objectionable, ruthless, impulsive and overspending, he neglected not only his six wives, but his people as well.

(Presiding Judge) Six wives?

(Defense Counsel) Henry was just a child when the first marriage was arranged.

Marriage to Catherine of Aragon serves no purpose other than to strengthen our alliance with Spain.

(Prosecutor) I intended to abandon that alliance without regard for the country.

(Attorney) Henry was always thinking about his country.

For the stability of the Tudor dynasty, a successor was desperately needed, but for 20 years Catherine had been childless.

(Prosecutor) A successor is made by two people, isn't it?

(Defense Counsel) Gohon, England needed a new queen anyway for stability, but the Pope refused to grant an annulment and remarry.

(Presiding Judge) You're in trouble. You won't be able to resist the Pope.

(Prosecutor) Even so, the king decided to go ahead.

It led to a centuries-long struggle to separate the country's religious community from Rome and establish it as an independent Church of England.

(Defense Counsel) We just put the churches in the country under their rightful control.

Rather, it saved the people from the corrupt system of Roman Catholicism.

And because Henry refused the upheaval of the Reformation, the people were able to preserve most of their religious traditions.

(Prosecutor) Objection! The church was supported and adored by the people because it gave comfort to the masses and did charity work.

Henry confiscated the Church's estates, hospitals were closed, and the monastery's priceless collections were lost forever, all to enrich the royal wealth.

(Defense Counsel) Some of the money was used to build new cathedrals and open secular schools.

Britain needed to solve these problems under its own rule, not under Roman rule.

(Prosecutor) You mean under Henry's control.

(Defense Counsel) No, all of the king's major reforms have been passed by parliament.

No other country at the time had so much freedom of speech in government.

(Prosecutor) Parliament formally approved any bill at the mercy of the king.

The king's side executed those they suspected of being unfaithful and ruled the country like a tyrant.

Among the victims was the brilliant politician and philosopher Thomas More, who had once been a close friend and mentor, as well as the new queen, Anne Boleyn, whom she had disturbed the peace of the country to marry.

(Presiding Judge) Did you execute your own wife?

(Defense Counsel) It wasn't the king's initiative.

Anne Boleyn was accused of treason in a power struggle with the king's aide, Thomas Cromwell.

(Prosecutor) It was a spurious trial, and without Henry's approval he was never convicted.

And the outcome of the trial didn't seem too bad for the king, as he remarried Jane Seymour just 11 days later!

(Defense Counsel): This marriage produced a male heir, ensuring a stable succession to the throne. But tragically, Jane died in a difficult birth.

Prosecutor: After this tragedy, the King did not learn, and married Anne of Cleves for the fourth time without much preparation.

Not content with that, he married Katherine Howard, who was Anne Boleyn's cousin, but Katherine was soon executed.

(Defense Counsel) You confessed to being unfaithful!

Anyway, my last marriage to Catherine Parr went very well.

(Prosecutor) Six times! It's evidence of his lack of discipline as a king. He allowed factions and intrigues to thrive in his court.

(Defense Counsel) One of the roles of the king is to be a role model for the people, even though he is arrogant.

He himself was a scholar, a musician, a patron of the arts, a great warrior and a sportsman.

And the extravagant games hosted by the king made Britain famous all over the world.

(Prosecutor) Even so, the policy, both foreign and domestic, was terrible.

The French campaign and the brutal Scottish invasion depleted the treasury, and the country suffered from chronic inflation as it tried to degrade the quality of its money to pay for its military.

The feudal lords and landlords responded by expropriating (enclosing) the farmland, leaving the peasants penniless.

(Defense Counsel) The peasants soon became independent farmers (Yoman).

Enclosures made agriculture more efficient, created surplus labor hours, and laid the groundwork for the industrial revolution.

It's because of the Yeomans and Henry that Britain became the great power it is.

(Presiding Judge) Well, aside from that, the portrait looks fine to everyone.

a devout believer who fell out with the church

Scholar who executed scholars

Henry VIII, the king who brought stability to the monarchy but used that power to his own laurels, embodied all the contradictions of monarchy as the country transitioned into modern society.

But separating rulers from myth is also part of putting history on trial.

Light, bright and cheerful

It's one of the most popular pieces of early 18th century music.

It's been used in countless movies and TV commercials, but what is this song and how did it come to be?

This is the beginning of "Spring" from "The Four Seasons" by Italian composer Antonio Vivaldi.

"Four Seasons" is well known for its pleasing to the ear.

But what's even more remarkable is that there is a story to tell.

When it was published in Amsterdam in 1725, it was accompanied by poems describing the characteristics of the four seasons, and Vivaldi tried to capture these poems musically.

Vivaldi was ahead of his time in setting a particular plot for his instrumental music.

If you read poetry while listening to music, the scenery that comes to mind from the poem will be in perfect sync with the imagery of the music.

It is said that birds greet spring with happy singing, and it is true.

But soon there will be a roar of thunder

It's not just thunder and lightning, but there are birds too, drenched in the rain, frightened and sad.

In "Summer," a turtledove sings his name in Italian, "tortorella," and then a hailstorm sweeps over the fields.

In "Autumn" brave hunters chase their prey

The "Winter" concerto opens with teeth chattering in the cold, seeking warmth before a crackling fire.

And again, in the storm scene, you'll slip on the ice and fall.

In the weeks following the onset of winter, the year begins to fall, and so does Vivaldi's The Four Seasons.

It wasn't until the early 19th century that this kind of expressive instrumental music, or program music, became popular.

By then, it had become the norm to tell stories in large, diverse formations with woodwinds, brass and percussion.

Vivaldi used only a solo violin and a string instrument, the harpsichord.

Unlike his contemporaries Bach, Vivaldi showed little interest in complex fugues.

He preferred to provide the listener with a more approachable enjoyment, where the familiar melody heard earlier reappears later in the song.

So in the "Spring" concerto, the first movement begins with a spring theme, and ends with a slight variation on that theme.

This technique attracted listeners and Vivaldi himself. Considered one of the most influential violinists of the early 18th century, he knew the importance of engaging his audience.

Performing at concerts as the main violinist

Appointed young musicians of "Pieta" "Pieta" is a girls' school in Venice where Vivaldi served as music director

Most of the students were orphans

Musical training was intended not only as a social skill for young women, but also as a career if their marriage didn't work out.

Even in Vivaldi's time, his music was for everyone, not just for the wealthy aristocrats.

300 years later, the technique still works, and Vivaldi's music still sounds like a galloping horse.

Communication underwater is difficult

It's hard to see or smell because light and smell don't travel well underwater.

But sound travels four times faster in water than in air, and because the ocean floor is so dark, marine mammals often rely on vocalizations to communicate.

That's why the sea is full of chorus

There are clicks, pulses, horns, grunts, bounces, screams, and tremors.

The greatest underwater symphonies are the melodies and songs created by the world's largest mammal, and that mammal is the whale.

Whale song is one of the most sophisticated forms of communication in the animal kingdom.

only a few species sing

They are the blue whale, the fin whale, the bowhead whale, the minke whale and the humpback whale.

These are all baleen whales that use hairy "baleen plates" instead of teeth to catch prey.

Toothed whales use echolocation, and toothed whales and non-singing baleen whales communicate with social sounds like shrieks and horns.

But those vocalizations aren't as complicated as singing.

What is the mechanism that produces sound?

Land mammals like us make sound by blowing air through our vocal cords, making them vibrate when we exhale.

Baleen whales have a U-shaped tissue between their lungs and a large bulging organ called the laryngeal sac.

We can't observe the internal organs of a singing whale, so I don't know for sure, but I think that when a whale sings, the muscles in its throat and chest contract to force air from the lungs through the U-shaped tissue into the laryngeal sac, causing the U-shaped tissue to vibrate.

The result is a cathedral-like choral resonance, loud enough to travel thousands of miles.

Whales don't have to exhale to sing

Air circulates back to the lungs and makes sound again.

The reason whale songs are so beautiful is because of their patterns.

Units such as groans, barks, and high-pitched voices combine to form phrases.

Repeated phrases create themes

Multiple themes, repeated in regular patterns, make up the song.

This hierarchical structure is a kind of grammar

Whale songs are varied and whales sing over and over again

In one recording, a humpback whale sang for 22 hours.

Then why sing?

I don't know the exact purpose yet.

It's the males who sing, mostly during the breeding season, so we can speculate that their singing attracts females.

Or they use territorial behavior to warn other males.

Whales use the same feeding and breeding grounds year after year, and each group sings a different song.

Songs evolve over time as units and phrases increase, change, and decrease.

Phrases are often exchanged when males from other groups are eating within earshot of the song, and perhaps the new song will make the males more attractive to the females.

The exchange of units and phrases is one of the earliest examples of cultural transmission, where acquired behaviors are passed on to non-consanguineous individuals of the same species.

You can hear the whales singing through an underwater microphone called a hydrophone.

Underwater microphones are useful for tracking species with few sightings or genetic samples.

For example, scientists were able to use song to identify groups of blue whales on a global scale.

But human activity is making the ocean noisy.

Boats, military sonars, underwater construction work, and more oil exploration are disrupting whale communications.

If human noise is too loud, whales will avoid important feeding and breeding grounds.

Humpback whales have been found to be singing less due to noise 200km away.

Restricting human activity on migration routes and critical habitats and reducing noise pollution across the ocean will help whales stay alive.

If whales can keep singing and we can keep listening, maybe the time will come when we can understand what they're saying.

Imagine you're looking at a runaway minecart on a rail with five workers behind it, but they can't escape.

By chance, you're standing by a turnout that you can use to divert the minecart onto the second rail.

But the problem is

There's also a worker on the rail at the junction, but only one.

what would you do

Would you sacrifice one life to save five?

This is the trolley problem, a kind of ethical dilemma that the philosopher Philippa Foot thought of in 1967.

The reason this problem is famous is because it forces us to think about how to choose when there are no good options.

Do you choose the most productive course of action, or do you stick to the moral code that forbids you from causing death?

In one study, about 90% of people said they would operate a turnout and sacrifice one person to save five people, and other studies, including virtual reality simulations of dilemmas, found similar results.

These judgments follow the philosophical principle of utilitarianism, that the decision that brings the greatest happiness to the greatest number is the morally correct one.

Five lives weigh more than one life, even with the death sentence for one.

But people aren't always utilitarian, and a little twist on the trolley problem shows that.

This time you're standing on a bridge on rails A runaway minecart is approaching

There's no second rail this time, and next to you on the bridge is a very large man.

If you push the man down, you can use his body to stop the trolley and save five lives, but he dies.

Based on utilitarianism, the decision would be exactly the same, sacrificing one person's life to save five.

But in this case, only about 10% of people would approve of pushing a man over a rail.

Our instincts tell us that intentionally causing someone's death is not the same as letting someone else die.

I feel it's wrong, but it's hard to explain why.

This intersection of ethics and psychology is what makes the trolley problem so interesting.

The many variations of this dilemma show that our judgments of right and wrong depend on factors other than the logical weighting of merits and demerits.

For example, men tend to prefer pushing men onto bridges over women.

People who watched comedy shows before the thought experiment tended to do the same.

In addition, one virtual reality study reported that people were more willing to be male than female victims.

There have been studies of how the brain is activated when we think about the original version and the bridge version.

Areas involved in conscious decision-making and emotional response were activated in both scenarios.

However, the bridge version had a much stronger emotional response.

And similarly, there was an increase in activity in the area that processes internal conflict.

what is the difference

One explanation is that pushing someone down is more self-inflicted, causing aversion to killing other people, yet conflicting because they know it's the logical choice.

The trolley problem has been criticized by some philosophers and psychologists.

They argue that the premise is so unrealistic that it doesn't prove anything, because the subjects don't take it seriously.

But new technologies are making this kind of ethical analysis more important than ever.

For example, a self-driving car might have to make a choice, such as causing a minor accident to prevent a major one.

Meanwhile, governments are researching autonomous military drones, which may be responsible for making decisions about whether to attack key targets, even if they result in injury to civilians.

If we want these actions to be ethical, we have to decide up front how to make decisions that respect human life and lead to better outcomes.

So researchers working on autonomous systems are collaborating with philosophers to tackle the complex problem of programming ethics into machines, proving that even hypothetical dilemmas can sometimes inevitably clash with the real world.

What is Bipolar Disorder?

"Bipolar" means two poles

For millions of people around the world who suffer from bipolar disorder, their lives are split between two realities: mania and depression.

There are many types of bipolar disorder, but let's consider two of them.

Type 1 is a combination of extreme mania and depression, while type 2 is a relatively short, mild manic phase within a long-term depression.

People with emotional seesaws find it difficult to find the balance they need to lead a healthy life.

An extreme type 1 high is known as a "manic episode," and it can make you feel irritable and overwhelmed.

But these euphoric episodes go beyond normal feelings of joy to cause troubling symptoms, such as thoughtlessness, insomnia, fast talking, impulsive behavior and risky behavior.

If left untreated, these symptoms become more frequent and intense and take longer to subside.

The depressive phase of bipolar disorder can manifest itself in many ways: depression, loss of interest in hobbies, changes in appetite, feelings of worthlessness or excessive guilt, excessive sleep duration, restlessness, dullness, or preoccupation with suicidal thoughts.

Globally, about 1 to 3 percent of adults experience a range of symptoms that appear to be bipolar disorder.

Most of them are working and contributing to society, and their lives, choices and relationships are not greatly affected by the disease, but for many of them the impact is severe.

This disease undermines school and work performance, relationships, financial security and personal security.

So what causes bipolar disorder?

Researchers believe that the brain's complex neural pathways are key.

A healthy brain maintains strong connections between neurons by constantly removing unnecessary or defective neural connections.

This process is important because neural pathways act as a map for all behaviors.

Scientists have used fMRI to discover that people with bipolar disorder are not as good at clearing out unnecessary neural circuits.

So the neurons get confused and create a network that they can't steer.

Forced to be guided by confused signals, people with bipolar disorder have abnormal thoughts and behaviors.

Psychotic symptoms, such as disorganized behavior, delusions, paranoia, and hallucinations, also manifest in the extreme stages of bipolar disorder.

This is due to an excess of a neurotransmitter called dopamine.

But with all that we know, we can't pinpoint a single cause of bipolar disorder.

It's really a complicated issue.

For example, the amygdala in the brain is involved in the processing of thoughts, long-term memory and emotions.

This brain region has a wide range of causes, including genetics and social trauma, that create abnormalities that lead to the symptoms of bipolar disorder.

This disease tends to run in families, so it's clear that genes have a lot to do with it.

But it doesn't show the existence of specific bipolar genes.

In fact, your chances of developing bipolar disorder depend on a complex set of genetic interactions that are not yet fully understood.

The causes are complex, and as a result, bipolar disorder is difficult to diagnose and live with.

However, the disease is controllable.

Certain drugs, such as lithium, can help reduce risky thoughts and behaviors by stabilizing mood.

These mood stabilizers reduce abnormal activity in the brain, thereby strengthening viable neural connections.

Other commonly used drugs include antipsychotics, which alter the action of dopamine, and electroconvulsive therapy, which induces carefully controlled seizures in the brain, sometimes used in emergency care.

Some people with bipolar disorder refuse treatment because they fear it will dampen their emotions and destroy their creativity.

But modern psychiatry actively seeks to avoid it.

Doctors now work with patients individually, combining medication and psychotherapy to help them live life to the fullest.

And beyond treatment, people with bipolar disorder can benefit from small changes.

Regular exercise, good sleep habits, abstinence from drugs and alcohol, not to mention acceptance and empathy from family and friends.

Bipolar disorder is a disease. It's not your fault, it's not your whole thing. It's something that can be controlled through a combination of the physical part of medical treatment, family and friends who watch over, understand and accept from the outside, and the patient himself/herself, who strives to find balance in his or her life.

Whether chained to a burning wheel, turned into a spider, or eaten by an eagle's liver, Greek mythology is full of tales of horrific consequences for those who angered the gods.

But one of the most famous punishments is not remembered not for its atrocious cruelty, but for its disturbing bluntness.

Sisyphus was the first king of Ephyra, now known as Corinth.

He was a clever king who made his city prosper, but he was also a devious tyrant, seducing his nieces and killing visitors to show his authority.

The desecration of the sacred tradition of hospitality enraged the gods.

But Sisyphus still had a chance of avoiding punishment if it wasn't for his reckless confidence.

Trouble began when Zeus kidnapped the fairy Aegina by transforming her into a giant eagle.

Aegina's father, the river god Aesopus, followed him to Epylah, where he encountered Sisyphus.

In exchange for Aesops building a spring in the city, the king told him where Zeus had taken his daughter.

When Zeus learned of this, he was enraged and instructed Thanatos, the god of death, to bind Sisyphus in chains in the underworld so that he would not cause him any trouble in the future.

But Sisyphus survived by his notorious cunning.

Just as he was about to be imprisoned, the king asked him to show him how the chains worked, and instead he quickly tied up Thanatos and fled to the Sabah.

No one can die because Thanatos has been captured.

The world was thrown into chaos, and the world returned to normal when Ares, the god of war, got angry that fighting was no longer fun, and unchained Thanatos.

Sisyphus knew that his day of retribution was near.

But he had another plan

Before he died, he asked his wife, Merope, to throw his body in the square and let it wash up on the banks of the River Styx.

Back in the underworld, Sisyphus approached Persephone, queen of the underworld, and complained that his wife had disrespected him for not giving him a proper burial.

Persephone gave permission to return to Saba and punish Merope on the condition that he would return to the underworld when he was done.

Of course, Sisyphus escaped death twice by cheating God instead of keeping his promise.

But when the messenger Hermes dragged Sisyphus to the underworld, there was no third time.

The king thought he was smarter than the gods, but Zeus had the last laugh.

Sisyphus' punishment was a simple task: push a huge boulder up a hill.

But every time I get closer to the top, the rock rolls down and I have to start all over again, over and over, forever.

Historians suggest that the story of Sisyphus may come from ancient myths about sunrises and sunsets and other natural cycles.

But the vivid image of a man condemned to an endless cycle of futile work resonates with allegories about the human condition.

In his acclaimed essay, The Myth of Sisyphus, the existentialist philosopher Albert Camus likened punishment to the futile search of man for meaning and truth in a meaningless and indifferent universe.

Instead of despairing, Camus imagined Sisyphus dying fearlessly every time he descended the hill to start rolling the rock again.

And if our daily efforts at times seem equally repetitive and silly, we can make them matter and valuable by embracing them as our own.

In 1965, a 17-year-old high school student, Randy Gardner, did an experiment that kept him awake for 264 hours.

11 days to see how he deals with insomnia.

By the second day, my eyes were out of focus.

then lose the ability to discriminate objects by touch

On the third day, I became emotionally unstable and clumsy.

By the end of the experiment, I had trouble concentrating, my short-term memory was impaired, I started to become paranoid, I began to hallucinate.

Gardner made a full recovery with no mental or physical sequelae, but lack of sleep can lead to hormonal imbalances that can lead to illness and, in extreme cases, death.

We're only beginning to understand why we sleep, but we all know that sleep is essential.

Adults need 7-8 hours of sleep per night, teens need about 10 hours.

It's the signals from your body that tell your brain that you're tired and the signals from your environment that tell it's getting dark outside to make you sleepy.

Increased secretion of sleep-inducing substances such as adenosine and melatonin causes light sleep, then deep sleep, decreased breathing and pulse rate, and muscle relaxation.

During this non-REM sleep, your DNA repairs and your body prepares itself for the next day.

In the United States, 30% of adults and 66% of adolescents are regularly sleep deprived.

this is no small thing

Insomnia can seriously harm your health

Insomnia affects learning, memory, mood and reaction time.

It also causes inflammation, hallucinations, hypertension, and has been linked to diabetes and even obesity.

In 2014, an avid soccer fan died after staying up for 48 hours to watch the World Cup.

His untimely death was due to a stroke. Studies have shown that people who chronically sleep less than six hours a night have a 4.5 times higher risk of stroke than those who consistently get seven to eight hours of sleep per night.

For people with a rare genetic mutation, insomnia is a daily reality.

It's a disorder known as fatal familial insomnia, in which you're in a nightmarish state of wakefulness, unable to escape to the refuge of sleep.

Within months or years, the condition progressively worsens to dementia and death.

Why does insomnia cause so much harm?

Scientists believe the answer lies in the accumulation of waste products in the brain.

When we're awake, our body's cells are busy using the day's energy sources, which are broken down into various byproducts such as adenosine.

Adenosine accumulates, increasing sleepiness, also known as sleep pressure.

Caffeine antagonizes these adenosine receptors.

There are other waste products that build up in the brain, and if they aren't cleared out, it's thought that the brain will be overwhelmed overall, causing all sorts of sleep deprivation-related ailments.

So what's going on in your sleeping brain to prevent this?

It turns out that a system called the glymphatic system acts as a cleaner and removes waste products, and this mechanism is active during sleep.

It flushes out harmful by-products between cells in the cerebrospinal fluid.

It was recently discovered that there are also lymphatic vessels in the brain that serve as conduits for immune cells, which may also play a role in clearing waste products from the brain.

Scientists continue to explore the healing mechanisms of sleep, but it's safe to say that sleep is necessary if you don't want to lose your health and sanity.

Today I'm going to tell you a story about liars, lawsuits and laughter.

The first time I heard about Holocaust denial, I laughed.

Holocaust "denial"?

The most well-documented and infamous genocide in the world, the Holocaust?

Deny it and who will believe it?

please think about it

If the deniers are right, who are they misrepresenting?

First, there are the victims, the survivors who testified to their own tragic experiences.

Who else?

I am a witness

Residents of the countless towns, villages, and cities on the Eastern Front saw their neighbors, young and old, men and women, rounded up en masse, taken to the outskirts of town, shot dead, and left in the open.

And so were the Poles, who lived in towns and villages near the extermination camps, and on a daily basis, they saw trains packed with people going to the camps and coming back empty.

But who will be the most serious false testimony of all?

are the perpetrators

People who testify, "We did it," "I did it."

This word may continue

"I couldn't help it. I was forced."

And yet they still say, "I did it."

please think about it

In war crimes trials since the end of World War II, no war criminal in any country has said, "That's not true."

Even if I say "I was forced to do it", I don't say "I didn't"

At that point, after much thought, I decided to leave the matter alone, and decided that I had more important things to do: my research, my papers, my worries.

A little over 10 years later, two great scholars -- two of the most prominent historians of Holocaust research -- approached me, "Would you like a cup of coffee with me?

I have a research project that is perfect for you."

It tickled my curiosity and my self-esteem that you'd gone out of your way to bring me a task with me in mind, and I asked, "What is it about?"

"Holocaust Denial"

this was the second time i laughed

Holocaust denial?

Some kind of flat earth theory?

Like Presley survival theory?

Do you want me to find out who said that?

And he said, "Yes, I'm interested.

Who the hell are they?

what is the purpose?

How do you convince people? ”

So I thought, if the professors think it's worth looking into, let's do it for a little while, just for fun, for a year or two, maybe four years at the most, because in academia, a few years is "a little while."

(Laughter) Academics are very slow.

(Laughter) Okay, I thought I'd look into it.

started research

As a result, I've come to a number of conclusions, two of which I'd like to share with you.

One is that the deniers are "wolves in sheep's clothing."

Essentially, it's akin to Nazis and Neo-Nazis.

But as far as I could see, there weren't any SS uniforms, no swastikas on the walls, no one doing the Siegheil Nazi salute.

Instead, what came out were people who acted like very respectable scholars.

what happened to them

was building a laboratory

Its name is "Research Institute for Historical Review".

At first glance, they also published a magazine called "Journal of Historical Review."

It's a journal full of articles with lots of footnotes.

It even had a new name

It's not "neo-Nazi," it's not "anti-Semitic," it's "revisionist."

It says, "We are revisionists.

We have one purpose: to correct historical misconceptions."

But if you take a little peek inside, you can see what it really is. What do you see?

It was the same glorification of Hitler, of the Third Reich, of anti-Semitism, of racism, of bigotry.

It was there that I became interested

Anti-Semitism, racism and prejudice masqueraded as rational theories.

I've also discovered that we are often taught that there are facts and opinions about things, but after studying the deniers, I changed my mind.

There are "facts", there are "opinions", and there are "lies".

Here's what the naysayers are trying to do: first, they pretend their lies are "opinions," for example, "new ideas," "unconventional opinions," but then they say that this is an "opinion" and should be discussed.

Then the deniers distort the facts.

I published my research in a book, "The Truth About the Holocaust: The Lies and Intentions of Genocide Deniers." This book has been published all over the world. Here in the UK, it came out from Penguin Books, when I was in touch with a publisher and was about to move on.

I received a letter from Penguin Books.

I laughed, this was the third time

It was no laughing matter

I opened the envelope and found out that David Irving was trying to sue me for defamation in British court for being called a Holocaust denier.

Say you'll sue me Who is David Irving

Who are you?

David Irving is a history writer. Most of his books are about World War II. In nearly all of his books, the argument he makes is that the Nazis weren't really that bad, and the Allies weren't really that good.

It's the claim that whatever happened to the Jews, they deserved it.

I knew I had the evidence, and even though I knew the facts, I somehow distorted them to come to this conclusion.

I've never been a denier, but in the late '80s, I became a very vigorous advocate of the denial.

I laughed because not only was this man denying the Holocaust, but he was proud of his denial.

This is the man who said, "I will sink the battleship Auschwitz."

And the man who pointed to the number tattoo on the survivor's arm and said, "How much money have you made with that arm tattoo?"

This is the man who also said, "Senator Kennedy killed more people in the Chappaquiddick case than in the Auschwitz gas chambers."

It's an American case, but please find out if it's true.

A man who denied the Holoscote without any shame or outside knowledge.

Now, many of my fellow scholars have advised me, "Don't deal with that guy."

When I explained that the defamation lawsuit could not be ignored, he said, "Who the hell would believe him?"

But there was a problem. Under British law, the burden of proof is on the side of the defendant, on me. You have to prove that what you say is true.

This is what it means

If I didn't fight, he would automatically win the case.

And if he wins, it's a valid argument to say, "David Irving's version of the Holocaust is the canonical view.

Deborah Lipstadt called me a denier, which established defamation.

Therefore, I, David Irving, am not a Holocaust denier."

Irving version is like this

"There was no plan to massacre the Jews. There were no gas chambers. There was no gun massacre. Hitler had nothing to do with this tragedy. It was all a Jewish hoax. The goal was to extort money from the Germans and create a Jewish state. The Jews fabricated documents and evidence with the help and cooperation of the Allies."

I thought that if I acquiesced in this, I wouldn't be able to face the survivors and the survivors' children.

I thought that if I acquiesced in this, I would be disqualified as a historian.

so we fought

Spoiler alert if you haven't seen the movie "Negation and Affirmation" yet, we won.

(Laughter) (Applause) The verdict was, "David Irving is a liar, a racist, an anti-Semite.

He had a biased view of history, laid lies, distorted the truth, and, most seriously, did this intentionally."

The patterns we showed were drawn from more than 25 high-profile examples.

It's not a trivial error. I'm sure there are many people in the audience who have writing experience, but mistakes are inevitable.

(Laughter) But in this case, it all went in the same direction: denouncing Jews and affirming Nazi innocence.

So how did you win

I traced Irving's footnotes to the source of the information.

What did this turn out to be?

In not the majority, nor the overwhelming majority, but in all the cases that touched on the Holocaust in some way, the alleged evidence was distorted, partially true, re-dated, rearranged, and the minutes added to people who weren't even present.

I mean, there was no evidence.

The evidence presented did not prove it.

we don't say "what happened"

What Irving claimed to be true, and incidentally, all of the deniers' allegations—because Irving either quoted them or quoted them back—we proved them wrong.

There was no evidence to substantiate their claims.

Now, my story is much more than just a story. It's more than a singular six-year, long and difficult legal case in which an American university professor is dragged into a legal battle and sentenced to be a "neo-Nazi polemicist."

what kind of message do you have?

There's a really important message in the story of what truth is.

Because today, as we all know, truth and facts are under attack, so to speak.

While social media has brought many benefits, it has also led to the disappearance of the distinction between "facts," which are objective fait accompli, and "lies."

And the third is extremism.

It doesn't show up in the form of the KKK's white robes or the ritual of burning crosses, and you may not even hear outright white supremacist rhetoric.

It goes by various names like the "Alternate Right" and the "National Front".

But at its core, it's the same extremist ideology seen in Holocaust denial, which pretends to be rational.

In this day and age, the "truth" is on the "defense", so to speak.

Recently published in The New Yorker—

It reminds me of a satirical cartoon about a quiz show, where the host says to one of the performers, "Yes, you're right.

But his opponent shouted louder, so it's his point."

what can we do?

First of all, don't let the plausible appearance fool you.

If you look underneath, you'll find extremism hiding.

And then we have to understand that there is no such thing as "relative truth."

Third, we must go on the offensive, not on the defensive.

If someone makes an absurd claim, even if that person is the highest ranking person in the country, or the highest ranking person in the world, you have to say, "Do you have proof?

what is the rationale? ”

you have to question the language

Don't equate their lies with facts.

As I said earlier, there are no relative truths.

Many of us were educated and raised in a sensible, liberal world where we were taught that everything is controversial.

but that's wrong

There are things that are definitely true

There are also undeniable facts and objective truths.

That's what Galileo taught us centuries ago.

After being forced by the Vatican to recant his theory that the earth revolves around the sun, he still spoke out. What was he reportedly saying?

"The Earth is still spinning"

the earth is not flat

the climate is changing

Presley can't be alive

(Laughter) (Applause) Most importantly, truth and fact are being attacked.

The impending difficulties before us - imposed upon us - are serious.

The time to fight is short

must act now

later it will be too late

thank you

(applause)

The family of the giant I serve is about to throw an extravagant dinner party.

But there's one problem: the Elder Giant's favorite shirt is wrinkled!

To fix it, you have to turn on the giant iron.

It requires two giant batteries.

I put 4 usable batteries and 4 unusable batteries in separate baskets, but apparently the baby giant mixed them up.

Hurry up and turn on the iron and smooth out the wrinkles on the giant's shirt, or the servants will be the main course tonight!

How can I find out which one set is usable within 7 tests? How can I find out which one set is usable within 7 tests?

If you want to find the answer on your own, pause this video. 3 seconds, 2 seconds, 1 second to the correct answer.

You may be lucky enough to find it soon.

But if you don't find it right away, it takes an inordinate amount of time to run that huge battery over and over again.

You can't count on luck, you have to plan for the worst and plan accordingly.

But the truth is, you don't have to try every combination.

Remember, there are four usable batteries in total, so if you choose any six, at least two of them are absolutely usable.

But that's not a quick fix, because even with six batteries, you'd have to do 15 tests.

But there's a hint to the solution: if you group the six batteries even further, you can reduce the number of possible combinations.

Now, instead of six batteries, take any three.

There are a total of three possible combinations in this group.

It takes two batteries to turn on the iron and make it work, so if it fails once, you can't tell if both batteries are bad or just one is bad.

But if all three combinations fail, then we know that this group either has one battery or none at all.

So let's put those three aside and do the same thing with the other three.

You might know the correct combination, but if all the combinations fail, you'll know that at most one of the three batteries will work.

I have only 2 batteries so far that I haven't tested yet.

There are four usable batteries in total, and we already know if there are two usable batteries, so both of these two batteries can be used.

By dividing the eight batteries into groups of 3, 3, 2, you can always get the answer right in no more than seven tests, no matter what order you put them together.

At the last minute, the iron turns on and I manage to iron the shirt cleanly.

A happy elder shows up at a party with his family in the perfect outfit... well, almost perfect.

Who of you wants to live at least until you're 80?

yes

It seems we all have hope that we will live a long life.

So let's take a look into the future, folks of the future, let's say we're all 85 years old.

Look at the two people on either side

one of them probably has Alzheimer's disease

(laughs) All right

Maybe you're thinking "I won't"

then you are the caregiver

Now -- (Laughter) in some ways, this terrible disease will affect us all.

Part of the fear of Alzheimer's disease is that there's nothing you can do about it.

Despite decades of research, no effective treatment has been found.

So even if we're fortunate enough to live long lives, it seems destined for Alzheimer's disease.

but it may not

What if we could change those odds, change the fate of our brains, without resorting to medical advances or silver bullets?

Let's look at Alzheimer's from the neuroscience perspective as we know it today.

This is how two neurons are connected.

The point that connects the two, circled in red, is called a "synapse."

At synapses, neurotransmitters are released

This is how signals are transmitted and communication occurs.

Thus we think, feel, see, hear, want

remember

And Alzheimer's disease happens at synapses.

Let's zoom in on a synapse and see what's going on in this illustration.

When transmitting information, neurons release neurotransmitters like glutamate into their synapses, or they release a small peptide called amyloid beta (Aβ).

Amyloid beta is metabolized and cleared by microglia, cleaning cells in the brain.

Although the molecular causes of Alzheimer's disease are still being debated, most neuroscientists believe that the disease begins when amyloid-beta begins to accumulate.

Is there too much released? Not enough is removed? Amyloid β increases at synapses

These stick together to form clumps called amyloid plaques.

Are any of you over the age of 40?

I'm afraid to raise my hand soon

The first step in this disease, the accumulation of amyloid plaques, is already in your brain.

Only a PET scan can detect this, and luckily you're unaware at this point.

I haven't yet experienced a loss of memory, language, or cognitive function—

"not yet

It's thought that it takes at least 15 to 20 years for amyloid plaques to accumulate and reach a critical point, and then a molecular cascade occurs, leading to the manifestation of the disease.

Forgetfulness before reaching a tipping point might be something like, "Why did you enter this room?"

"What was this person's name?"

"Where did you put your car keys?"

Now, before you all start panicking -- half of you have probably experienced one or the other in the last 24 hours, it's just plain forgetfulness.

In fact, these examples may not even have anything to do with your memory, because you didn't pay attention to where you put your keys.

When you cross a tipping point, your memory malfunctions and your language and perception changes.

Eventually, the keys won't be in your coat pocket or on the table by the door, but in the refrigerator.

What happens when amyloid plaques accumulate to this critical point?

Microglial scavenging cells become hyperactivated and release substances that cause inflammation and cell damage.

And in fact, it's thought that they begin to remove the synapses themselves.

Aberrant phosphorylation of tau, an important microtubule-associated protein, results in neurofibrillary tangles called tangles that damage neurons from the inside.

In the middle stages of Alzheimer's disease, there's massive inflammation, tangles, synaptic chaos, and cell death.

If you were a scientist studying this disease, at what point would you most want to intervene?

Many scientists are betting on the simplest solution, which is to prevent amyloid plaques from reaching a critical point, which means that drug discovery is primarily focused on inhibiting, clearing, and reducing the accumulation of amyloid plaques.

Treatment for Alzheimer's disease will likely be preventative medicine.

Take this drug before it hits a tipping point, before it triggers a cascade, before you start forgetting the keys in the fridge.

Clinical trials of these kinds of drugs have failed so far, not because there was a mistake in science, but because the participants in these trials were already sick.

it's too late

Think of an amyloid plaque as a lit match.

At the critical point, the match sets the forest on fire

Once you set the forest on fire, it's too late no matter how many matches you blow out.

The match must be extinguished before the forest catches fire.

Before scientists find a cure, this information is good news because the way we live our lives determines the buildup of amyloid plaques.

There are a few things you can do to avoid reaching that critical point.

Think about your risk of developing Alzheimer's disease on the seesaw scale.

You stack the risk factors on one side, and when that side hits the floor, you're going to get sick and be diagnosed with Alzheimer's disease.

let's say you're 50

I'm not young anymore, so I've accumulated some amyloid plaques over the years.

That's why the seesaw is tilted a little

let's see your DNA

we all inherit genes from our parents

Some genes increase risk, some reduce it.

Just like Alice in "Still Alice," if you inherit a rare genetic mutation that causes amyloid beta to proliferate, the seesaw will tilt completely.

But for most of us, genetic factors don't really affect us that much.

For example, APOE4 is one of the polymorphisms that increases amyloid, but inheriting APOE4 from your mother doesn't necessarily mean you'll get Alzheimer's disease, which means that for most people, DNA alone doesn't determine whether or not you get Alzheimer's disease.

So what are the factors?

We have no control over aging or genetics.

Our brain's destiny hasn't changed yet, hasn't it?

How's your sleep?

During deep slow-wave sleep (SWDS), glial cells ride on the cerebrospinal fluid, circulating in the brain and washing away metabolic waste that accumulates at synapses during waking hours.

Deep sleep is like a powerful cleanse for your brain.

So what happens when you cut your sleep time?

Many scientists believe that sleep deprivation is a predictor of Alzheimer's disease.

Amyloid beta increases when you don't sleep at night

And the accumulation of amyloid beta has been shown to interfere with sleep, which leads to further amyloid accumulation.

This positive feedback loop accelerates the seesaw's tilt toward the critical point.

Other than that?

cardiovascular health

High blood pressure, diabetes, obesity, smoking and high cholesterol levels have all been shown to increase the risk of developing Alzheimer's disease.

In one autopsy study, 80 percent of people with Alzheimer's disease had cardiovascular disease.

Various animal model studies have demonstrated that aerobic exercise reduces amyloid beta.

A Mediterranean diet, which is good for your cardiovascular system, keeps the seesaw from tilting.

All these efforts can prevent or delay the onset of Alzheimer's disease.

But let's say, for example, that we're not doing any of these things.

And let's say you're 65. You have Alzheimer's in your family, so you might carry the gene.

(Laughter) Let's say your amyloid plaque buildup reaches a critical point.

One side of the scale hit the ground

The cascade accelerated, setting the forest on fire, causing inflammation, tangles, and cell death.

Symptoms of Alzheimer's disease appear

I can't remember where the words or keys are, and I can't remember what I said at the beginning of this story.

but it might not

Even if your brain is completely sick, there's one more thing you can do to protect yourself from the symptoms of Alzheimer's disease.

It's about neuroplasticity and about cognitive reserve.

Remember, Alzheimer's disease is caused by synaptic defects.

There are over 100 trillion synapses in the average brain, which is great. It's a lot of resources.

and this amount is not decisive

Our synapses are constantly growing and shrinking, and this is called neuroplasticity.

Every time we learn something new, we create and reinforce new neural connections and synapses.

The "Nun Study" followed 678 nuns over 20 years, who were over 75 years old at the start of the study.

They had regular health checks and cognitive tests, and after they died, their entire brains were donated to autopsy studies.

Scientists have discovered something surprising about some brains

Despite the obvious signs of Alzheimer's disease, such as the presence of plaques, tangles, and brain atrophy, the nuns with these brains showed no symptoms during their lifetimes.

Why the hell?

We think this is because they had a higher cognitive reserve, which means they had more synapses to function.

People with long formal education, high literacy, and engaging in mentally stimulating activities have higher cognitive reserves.

Nerves are abundantly connected in many layers, so

Even when a disease like Alzheimer's disease has knocked out some of the synapses, there are still spare neural connections that act as buffers that you don't realize you're missing.

Consider a simple example

Suppose you know only one thing about a subject

For example about me-

Lisa Genova, author of "Still Alice," that's all you know about me.

You only have one neural connection, one synapse.

Now let's say you have Alzheimer's disease.

There's plaque, there's tangles, there's inflammation, microglia are eating away at synapses.

If you were to ask me, "Who wrote 'Still Alice'?" you wouldn't remember, because synapses degraded and disappeared.

you forgot me forever

But what if you knew more about me?

Suppose you know four things about me

And let's say you have Alzheimer's disease and three informational synapses are damaged or destroyed.

But you bypassed the damage

remember my name

It's able to mobilize pathways that haven't been compromised and endure the symptoms of Alzheimer's disease.

Humans build these alternative pathways, or cognitive reserves, by learning new things.

Ideally, we want to learn new things that are rich in meaning, something that evokes visual and auditory information, associations and emotions.

Something like a crossword puzzle isn't as effective.

It's not enough just to retrieve the information you've already learned, rather than backtracking on familiar roads or walking down familiar streets.

creating new neural pathways

Learning a foreign language, making new friends, reading books, listening to TED Talks are ways to make your brain more resistant to Alzheimer's disease.

If you are diagnosed with Alzheimer's disease, here are three lessons I learned from my grandmother and other Alzheimer's patients.

Being diagnosed with Alzheimer's doesn't mean you'll die tomorrow.

stay alive

because you don't lose your emotional memory

you still know love and joy

Even if you can't remember what I said five minutes ago, you'll remember how I felt.

you are more important than mere memory

thank you

(applause)

Let's say you're sick of Western democracy.

The pitfalls that come with democracy Free elections Town meetings Endless debates about what the role of government should be

It's too messy, it's too unpredictable, it's too restrictive, it doesn't suit me

And I can't stand the way democracies band together to admonish everyone else about individual rights and freedoms.

What should I do?

If you list all the hypocrisy and failures of Western democracy and tell them that your way is better, you won't succeed.

So what if we could create an opportunity for the people, who are the foundation of these democratic nations, to question the system?

It makes people think, "Democracy and democratic institutions are failing us. Society is at the mercy of corrupt elites. Once good nations are falling."

To do that, you have to sneak into the information space of a democracy.

It turns democracy's greatest strength, an open mind, into democracy's greatest vulnerability.

It makes people question the truth

Now, you know the hacks and leaks that happened in 2016, right?

First, the Democratic National Committee's (DNC) internal systems and staff email accounts were compromised before being made public on WikiLeaks.

After that, various online figures, such as a cybercriminal who claims to be Romanian but doesn't speak Romanian, pushed these leaks to the press.

The media seized on this bait

Bernie Sanders' dislike within the Democratic Party caused a stir.

At the time, the story was so topical that it was drowned out by the news, namely, that Advanced Persistent Threat 28, abbreviated as APT28, a Russian government-sponsored hacker group, was carrying out these attacks against the United States.

there was plenty of evidence

These Russian regime hackers didn't pop up in 2016, we've been following them since 2014.

From the tools that APT28 used to get into the systems they attacked, I learned that this is a well thought out, well budgeted practice that has been going on for over a decade, and it happens between 9:00 am and 6:00 pm Moscow time.

The emails and contacts targeted by APT28 belong to journalists in Chechnya, to the Georgian government, to military attachés in Eastern Europe, and all targets are unmistakably related to the Russian government.

not just my company

Government organizations and research teams around the world came to similar conclusions and observed the same types of intelligence operations.

But what Russia was doing in 2016 was far from spying.

The DNC hack is just one example of how stolen data was published online, sensationalized, amplified on social media, and quickly dominated the media.

But it didn't sound the alarm that one nation-state is trying to discredit a government in the internal affairs of another.

So why couldn't we foresee it?

Why did it take the American public months to realize that they were being exposed to an "information attack" funded by another country?

In short, politics are bad.

The Obama administration was stuck in a dilemma with no solution.

If the Russian government interferes in the U.S. presidential election, it could give the impression that the administration is interfering with the election campaign itself.

But more precisely, the Western world was simply ill-equipped to recognize and respond to modern-day information operations, even though in the not-so-distant past, the United States used its intelligence powers with terrifying success.

And think about it, for the last 20 years, the West has spent a lot of effort on information security, thinking about which networks to harden, which infrastructure is important, how to equip information warriors and intelligence forces, while Russia has been thinking far ahead.

Even before the first iPhone hit stores, the Russian government understood the risks and opportunities that technology presented, the risks and opportunities that technology presented, the reciprocity and immediacy of communication.

As our reality became increasingly dominated by the information that flowed through our devices, the news feeds we skimmed, the popular stories and hashtags, the Russian government was the first to recognize that technological advances had transformed the human mind into the most flexible tool on the planet.

Especially easy to manipulate is the mind of a person who is used to the endless flow of information that is becoming more and more personalized these days.

This interesting mix of information helps create a "back door" that can sneak into the mind of a nation or anyone else.

This new kind of state-funded information operation is therefore more successful, less noticeable, and more difficult for the target of the operation, including the media, to decipher and discern.

By circulating hashtags on Twitter, by creating a ripple effect with fake news targeted at targets who are ready to receive information, and by forcing members of the press to sift through a flood of emails looking for the wrong word — all tactics used by Russian intelligence forces — you have the opportunity to effectively camouflage an information operation and sneak it into your target's head.

Russia has long called this "reflex control."

It's the art of using information to manipulate other people so that they'll make decisions that they think will be beneficial to you.

This is advanced information manipulation and cognitive manipulation at the national level, and it can be done by any means, any tool, online or offline, anything that can be achieved.

Let me give you another example

In early February 2014, a few weeks before Russia invaded Crimea, a phone call was made public on YouTube.

It's a conversation between two American diplomats.

They sounded like they were choosing key positions in the Ukrainian government, and even worse, they were blaming the EU for their lack of leadership and speed in resolving this crisis.

The conversation was picked up by the media, and subsequently turned into a diplomatic issue that threw both the U.S. government and Europe into turmoil.

As a result, the reaction from the West to Russia's seizure of Crimea was divided and the attitude became more hesitant.

Just like Russia thinks

So, in the midst of all the media hype of wiretapping, emails and system hacking, the real purpose of the operation is to influence the decisions of the target, to manipulate the opinion of the target, all in the strategic interest of the nation-state behind it.

This is power in the information age

If that "information" has a genuine part, the temptation is already strong, and it's already easy to swallow and spread.

Who wouldn't be interested in the truth of a phone call or email that they never expected to be made public?

But if you don't know why it was exposed, you won't know the true meaning of it.

We have to recognize that this place we're increasingly dependent on, quaintly called "cyberspace," isn't defined by the 0s and the 1s, but by the information and the people behind it.

It's much bigger than just connecting computers and terminals.

It's a network of human minds interacting with computers and devices.

This network has no encryption, no firewalls, no two-factor authentication, no sufficiently secure passwords.

Your self-defense tools are much more powerful, more adaptable, and always up to date.

It's the power to think critically, speak out against falsehoods, and demand facts.

But most of all, we need the courage to pursue the truth resolutely.

(applause)

(Chris Anderson) Elon, welcome back to TED.

thank you

(Elon Musk) It's an honor to be here.

CA: I'd love to hear your vision of what an exciting future might look like in the next 30 minutes. (Why are you bored?)

(Elon) Right

I often ask myself

We're digging a hole under Los Angeles, with the goal of eventually creating a three-dimensional network of tunnels to reduce traffic congestion.

Traffic jams are the most annoying thing for us today.

problem all over the world

so much time wasted

it's terrible

Ross is especially cruel

(Laughter) (Chris) So you've got the first concept video for that.

let's see

Elon: Well, you'll know what I'm talking about.

There are two keys to creating a three-dimensional tunnel network.

First, we need to connect the tunnel entrances and exits seamlessly with the city's transportation network.

By putting a car on something like a skate and moving it in an elevator, you can get in and out of the tunnel network with just two parking spaces.

Cars are carried on those skates

There is no specific speed limit, it's designed to operate at 200km/h.

(Chris) How much?

Elon: 200 kilometers per hour, or 130 miles per hour.

So, for example, you'll be able to get from Westwood to Los Angeles International Airport in five or six minutes.

(Applause) (Chris) Will it start out like a toll road?

(Elon) yeah

Chris: And if the congestion on the ground would be alleviated to some extent.

Elon: I don't know if you've noticed in the video, but there's really no limit to how many levels of tunnels you can build.

The bottom can go further than the top

The deepest mine is much deeper than the height of the tallest building, so a 3D network of tunnels can handle any amount of congestion.

this is an important point

The main objection to the idea of ​​tunnels is that you add another level of tunnels that temporarily relieves congestion, and when it's full, it's back to the original congestion.

But you can increase the number of tunnels and layers as much as you want.

CA: But tunneling is very expensive, and that's considered a roadblock to this idea, isn't it?

(Elon) yeah

That's right

For example, it cost $2 billion to extend the Los Angeles subway four kilometers.

That's about $500 million per kilometer to extend the L.A. subway.

It's not even the busiest subway in the world.

So it's true that digging tunnels in general is a big deal.

I think we have to improve the tunneling cost per length by at least 10 times.

(Chris) How do you do that?

Elon: I actually think that by doing two things, you can improve it by almost a factor of ten or more.

First, cut the diameter of the tunnel in half or less.

The diameter of a one-lane tunnel is regulated to be 8m or 8.5m, in order to allow passage of emergency vehicles in the event of an accident and to ventilate exhaust gases from gasoline vehicles.

We're going to shrink it down to four meters, which is enough to run an electric skate, and then it's half the diameter and one-fourth the cross-sectional area, but the cost of tunneling is proportional to the cross-sectional area.

That's half the 10x improvement.

And the current tunnel excavators are resting half the time, while they're strengthening the tunnel walls.

So if we could build a machine that could drill and reinforce walls in sequence, we could double the efficiency.

Combined, that's an eight-fold improvement.

The excavator has not yet reached its power and thermal limits, so we can push the power up a lot.

At least 2x, maybe 4 or 5x improvements that can add up.

So, in a series of very simple steps, we can improve the cost of excavation by a factor of 10 or more per length. Our actual goal is -- we have a pet snail named Gary, named after a character from "South Park" -- SpongeBob SquarePants.

(Laughter) Gary the snail is currently 14 times faster than a tunnel boring machine.

(Laughter) (Chris) I want to beat Gary.

Elon: I want to win.

(Laughter) Gary is not a patient bitch, so this is a big win.

Victory over the snail

Chris: When people think of cities of the future, they think of flying cars and drones.

think about going up

Isn't that better?

It doesn't cost to dig tunnels.

(Earon) I also like things that fly.

I'm making rockets too, so anything that flies is good

It's not that flying things have resistance.

Something's flying right over your head -- it's not a very comforting situation to have so many flying cars flying all over the place.

(Laughter) I don't think you're going to say, "I feel refreshed today."

Rather, "Does the hubcap fit properly? Will it fall off and get my head chopped off?"

would be worried

CA: So you have a vision of a city of the future with a massive network of three-dimensional tunnels underground.

Is there any connection with Hyperloop?

Using this tunnel for the Hyperloop idea that you announced years ago?

Elon: We've been playing around with this thing called Hyperloop for a while.

Right next to SpaceX, we also built a Hyperloop test track for a student competition for innovative transportation ideas.

As a result, it became the world's largest vacuum chamber after the Large Hadron Collider.

It's been a really fun experience, but it's kind of a hobby. I built a little propulsion vehicle that pushes the pods that the students built, and I want to see how fast it can go when it's not pushing anything.

Even if it's only a distance of 1.3km, I think we can do it faster than the world's fastest super express train.

(Chris) That's a great brake.

(Elon) Certainly

Either they collide and fall apart, or—

Chris: You can imagine Hyperloop running long distances through tunnels.

(Elon) yeah

Talking about tunnel technology, if you want to make a tunnel that is tight against the water table, you have to design the tunnel walls to withstand five or six times the atmospheric pressure.

To maintain a vacuum, you only need to withstand 1 atm.

If you build a tunnel that can withstand the water table, it will automatically be able to hold a vacuum.

(Chris) I see

(Elon) That's right.

CA: In Elon's future, how long will the hyperloop tunnel go?

Elon: I don't think there's really a limit to length.

you can dig as much as you want

For example, a Washington, D.C.-New York hyperloop would be entirely underground, because it's a densely built-up area.

You'll be going under a lot of buildings and houses, but if it's deep enough, you won't even notice it's there.

You might think that it must be annoying to have a tunnel dug under your house.

If a tunnel is dug three or four tunnel diameters deep, you probably won't notice it.

In fact, if it could detect tunnel digging, it would make a lot of money off of the device, because it would be coveted by Israeli military authorities trying to find tunnels being dug by Hamas, and by U.S. Customs and Border Protection trying to find drug-smuggling tunnels.

In fact, soil is so good at absorbing vibrations that it becomes almost undetectable at tunnel depths above a certain depth.

If we had a very sensitive seismometer, we might be able to do it.

CA: So you created a new company for that, The Boring Company.

it's a masterpiece it's funny

(Laughter) (Elon) What's so funny?

(Laughter) (Chris) How much time do you spend on this?

Elon: Probably around 2-3%.

(Chris) You got a hobby

Here's Elon Musk's hobby, folks.

(Laughter) (Elon) Interns and other people are doing it part of the time.

buy a used machine

It's kind of a mess, but we're making good progress. Chris: So a lot of your time is being spent on electrifying cars and transportation through Tesla.

Could it be that one of the motivations for the tunnel project is that when cars become electric and self-driving, the roads may be filled with more cars than they are now?

Elon: That's right.

Many people believe that autonomous cars will allow them to travel faster and reduce congestion.

To a certain extent, yes, but with shared autonomy, driving will go where you want, and it'll be cheaper, and cars will be more affordable than buses.

Is it cheaper than the bus fare?

So with shared autonomy, we're going to have a lot more car trips and a lot worse traffic.

Chris: You started Tesla to show that electric is the future of the car, but a few years ago everyone was laughing at you.

no longer so

(Earon) Is that so?

(laughs) I don't know.

Chris: Most of the auto companies have announced full-scale electrification plans in the short to medium term, haven't they?

(Elon) Right

Almost every car company will have some kind of electric car plan.

There are differences in authenticity

Some are seriously thinking about moving to all-electric vehicles, while others are just nitpicking.

Some are still chasing fuel cells, but they won't last long.

CA: Don't you feel it's time to declare victory?

"We did it," wouldn't you rather leave electrification to other people and put your energy elsewhere?

Elon: Well, as far as I can imagine

I'm going to stay with Tesla, and there's a lot of exciting things waiting for me.

Model 3 coming soon

We'll also be unveiling a Tesla semi-trailer.

(Chris) Oh, let's talk about it.

The Model 3 was supposed to come out around July.

Elon: Yeah, we're on track to start production in July.

(Chris) Good.

I think what everyone has high hopes for is that it will have self-driving cars.

I showed you what it's all about in this video a little while ago.

(Elon) yeah

CA: Even the current Model S has an autopilot.

What do you see here?

Elon: It's just using a camera and a GPS.

No LIDAR or Radar

It uses only passive light, and it's the same one that humans use.

Road systems are designed to be steered by passive lights and cameras, so if you solve the camera or vision problem, you solve the self-driving problem.

If you can't solve vision, you can't do self-driving.

That's why we're focusing on visual neural nets, which are very effective at understanding road conditions.

CA: A lot of other companies are using lidar.

It's often a combination of cameras and radar.

Elon: A camera alone can outperform a human by far.

Cameras alone can do 10 times better than humans.

Chris: Every new car that's being sold today has eight cameras.

I can't do something like this video yet

When will it be possible?

Elon: Right now, as planned, by the end of the year, we'll be able to drive fully autonomously across the United States from Los Angeles to New York.

Chris: They said that at the end of this year, you'll be in a Tesla, and you can just type "New York" without touching the steering wheel, and they'll go.

(Elon) yeah

CA: By the end of 2017, you won't have to touch the steering wheel.

Elon: Yeah, in November or December of this year, you'll be able to go from a parking lot in California to a parking lot in New York without touching any controls.

(Applause) (Chris) That's amazing.

Part of the reason it's possible is that there are a lot of Tesla cars already on every road.

This is probably because a huge amount of data on national highways has been accumulated.

Elon: Yes, but what's interesting is that you're confident that you can do it even if you dynamically change the route.

It's a different problem than being able to self-driving on a fixed route, but this should work just about anywhere.

Not limited to between Los Angeles and New York

You can change it on the fly and go from Seattle to Florida.

I was going to go from Los Angeles to New York.

You can also divert from Los Angeles to Toronto.

CA: Let's put regulations aside for now, just as far as technology is concerned, how long before you can safely buy your car, literally let it go, go to sleep, and wake up to find yourself at your destination?

Elon: About two years, I think.

The point is, it doesn't work 99.9% of the time. If one in a thousand times a car crashes, you can't sleep well.

you shouldn't actually sleep

(Laughter) You'll never be perfect.

No system is perfect, but if you live 100 or 1,000 lives and your car is unlikely to crash, people think, well, if you live 1,000 lives and you're unlikely to have an accident, you'll be fine.

(Chris) Sleep well.

I think your big concern is that people will assume they're safe too quickly, and that terrible accidents will happen and stop progress.

Elon: I think an autonomous system would at least mitigate accidents, except in very rare circumstances.

The thing to understand about car safety is that it's probabilistic.

Any human driver who drives a car can cause an accident through their own human error.

it is never zero

So the real threshold for self-driving cars is how much better self-driving cars need to be than humans for people to rely on them.

CA: When hands-free driving becomes totally safe, it's going to be a game-changer for the industry, because you're talking about buying a car, going to work, and having the car do Uber-like services to make money, and then you can pay for the lease of the car and get the car for free.

Will that really happen?

Elon: I'm pretty sure it will.

There will be a flood of shared self-driving cars. Once you buy a car, you can use it for yourself, or only allow it for your friends and family, or let only highly rated drivers use it, or share it for a limited time.

100% that will happen

The only question is when

(Chris) That's amazing.

There was talk of a semi-trailer earlier, and I heard that it will be announced in September. Is there anything you would like to show us today?

(Elon) Let me show you the trailer for the truck.

(Laughter) It's real.

(Chris) okay

Elon: This is definitely where we want to be vigilant with self-driving capabilities.

(Laughter) (Chris) You can't really see it, but it doesn't look like the cute trucks in the neighborhood.

cool but

What kind of semitrailer is that?

Elon: This is a large long haul semi-trailer.

It has a large payload capacity and can travel long distances.

Aiming to improve heavy truck transportation

This is something that people don't think is possible today.

People think that electric cars don't have enough horsepower or range, but with this Tesla semi-trailer, we want to show that electric trucks can out-torque diesel trucks.

If there was a tug-of-war, the Tesla semi-trailer would beat the diesel semi-trailer, even going uphill.

(Laughter) (Applause) (Chris) Great. In the short term, this is not self-driving.

A truck that truck drivers want to drive

Elon: Yeah, what's really nice about this is that with an electric motor, the torque vs. rpm graph is flat, whereas with a diesel or whatever internal combustion engine, the torque vs. rpm graph is chevron-shaped.

So this is going to be a nimble track.

You can drive around like a sports car

No gears, single speed

Chris: Sounds like it could make a great movie.

I don't know what the story will be, if it's going to have a happy ending, but it looks like it's going to be a great movie.

(Laughter) (Elon) It's weird when you test drive it.

When I drove the first truck prototype,

It's a very strange feeling, and you're driving a huge truck, and you're very agile.

Chris: Are you driving the prototype yourself yet?

Elon: Yeah, I rode it around in the parking lot, and I thought this guy was amazing.

(Chris) It's not a picture of rice cake

Elon: You can do great tricks with a giant truck.

Chris: That's fine. I'm going to change the topic from a really cool photo to a slightly cool photo.

Is this a fancy house from Desperate Housewives or something?

what is this?

Elon: This is an image of what the future will look like.

There is an electric car in the garage

If you look between the electric car and the house, there are three powerwalls and the roof is made of solar panels.

solar glass roof

(Chris) I see

Elon: That house is real, it's a real fake house.

really exists

(Laughter) (Chris) So those roof tiles have solar panels in them. (Chris) Solar glass tiles can be very finely tuned in texture and color. There are tiny shutters in the glass, and if you look at the roof from the street, the tiles look the same with or without the solar cells.

They look the same color from the ground.

If you look from a helicopter, you can see through, and you can tell which tiles have solar cells behind them and which don't.

But from the ground, I don't know

Chris: If you're in a sunny spot, that roof can be very affordable.

It's not that expensive compared to regular roofing.

(Elon) yeah

I'm pretty confident about that, but a solar glass roof costs less than a normal roof plus your electricity bill.

Financially it's a no-brainer. It looks great, it's going to last a long time.

Long after the house crumbled, even if nothing remained, the glass tiles would still be there.

(Applause) (Chris) That's great.

Say you're going to sell 4 types within 2 weeks

Elon: We'll start with the first two, and we'll add the other two early next year.

CA: How big are you thinking?

How many houses will have roofs like this?

Elon: I think one day almost every house will have a solar roof.

What you have to think about is that the time scale we're talking about here is 40 or 50 years.

On average, a roof needs to be replaced every 20 to 25 years.

We're not going to start replacing all of our roofs right away.

But if you think about 15 years from now, roofs without solar panels will be rare.

CA: The mental model that people have a hard time understanding is that the changing costs, the changing economics of solar power, is what happens when most homes have enough sunshine, and if they just capture it.

We will be able to provide the power we need, and then the power grid will

you don't have to depend

Elon: Depending on where the house is located and the size of the house relative to the area of ​​the roof, many American homes will have enough roof area to power their homes.

CA: The key to the economics of electric cars, electric semi-trailers, and these kind of homes is that lithium-ion battery prices are falling, and you've made a big bet on that with Tesla.

In many ways, you might call it a core competency.

To ensure its competitive advantage, you're going to build the world's largest manufacturing plant to double the global supply of lithium-ion batteries.

Elon: This is the progression of the "Gigafactory."

When it's finished, it's going to be a giant diamond shape, and it's going to point true north.

It's a small detail

Chris: When we're able to produce 100 gigawatt hours of battery per year.

Elon: 100 gigawatt hours, maybe more.

Chris: You've already started production.

(Elon) It's already in production. (Chris) You've released the footage. Is it sped up?

Elon: This is slowed down.

(Laughter) (Chris) How fast is it really?

Elon: If you're running at full speed, you won't be able to see the cell unless you use a strobe.

vaguely

(Laughter) (Chris) One of your core ideas for building a great future is a future where you don't have to feel guilty about energy.

to get there

How many Gigafactories will we need?

Elon: About 100.

neither 10 nor 1000

100 is likely

Chris: I think that's great.

You have an image of what it takes to disconnect the world from fossil fuels.

You build one, it costs $5 billion, $10 billion

It's amazing that you can think of a project like that.

And you have two more construction announcements planned for the rest of the year?

Elon: We're announcing two to four sites this year.

there will probably be four

(Chris) It's also

(Applause) What can you tell me?

Somewhere, what continent?

No comment is fine

Elon: I think we need to answer the global market.

(Chris) okay

(laughs) great

I can't leave it out — I have a topic

I have just one question about politics.

I'm tired of talking politics, but I want to ask you one thing.

You're on the list of people who give advice to someone (Earon) Who is it?

CA: The person says he doesn't believe in climate change, and a lot of people think you shouldn't be with him.

I want you to walk away

What do you say about it?

Elon: First of all, I'm only in two advisory bodies, and the format is that you walk around the room and listen to other people's opinions, and we meet once every month or two.

It just is the thing

In that room, there are people who believe that climate change and social issues should be addressed, and I've been advocating through these conferences that we should address immigration and climate change.

(Applause) If I didn't, it wouldn't even be on the agenda.

It may not have changed anything, but at least I said what I had to say.

(Chris) Okay

(Applause) Now let's talk about SpaceX and Mars.

Last time you came over, you talked about your ambitious dream of a reusable rocket.

you did it

(Elon) It took a while

(Chris) Let's talk as we watch the video What is this?

Elon: This is a high-velocity, high-altitude launch vehicle coming back to Earth.

After delivering the upper level at high speed

I think it's about Mach 7, but deliver the upper stage —

(Applause) (Chris) This is speeding up — (Elon) This is slowing down

(Laughter) (Chris) I just thought it was going to speed things up.

It's amazing, but you failed a few times before you finally succeeded. How many times did you do it? Five or six?

Elon: Eight or nine times.

Chris: And then you flew the rocket that landed for the first time again.

Elon: So we landed the launch vehicle, got it ready to fly, and launched it again -- the first relaunch of an orbital booster where a relaunch really matters.

It's important to understand that reuse only makes sense if it's short and complete.

Like an airplane or a car, it can be fully reused in a short period of time.

No need to take it to the factory for service before your next flight

CA: So this opens up the really ambitious idea of ​​sending a lot of people to Mars, maybe in the next 10 or 20 years.

(Elon) yeah

Chris: And you designed a crazy rocket for that.

I want everyone to know how big it is

Elon: That's a human —

this is the rocket

(Laughter) (Chris) I read somewhere that the building equivalent is 40 stories.

Elon: It's probably a little more expensive.

It has about four times the thrust of a Saturn V lunar rocket.

Chris: That's four times the thrust of the biggest rocket mankind has ever built.

(Elon) yeah

(Chris) About flying (Elon) yeah

(Laughter) A Boeing 747 has a quarter of a million pounds of thrust, so 10 million pounds of thrust would take 40 747s.

This rocket has the thrust of 120 747s with their engines at full blast.

Chris: A rocket that can leave the Earth's gravitational field, and you're talking about putting a whole 747, full of people and cargo, into orbit.

Elon: That's right, this rocket can carry a 747 with a full tank of fuel, full passengers, and a cargo bay full of cargo.

CA: You recently released a video of an interplanetary transportation system based on this.

Did you paint what you would look like in 30 years or 20 years?

People boarding this rocket

Elon: Hopefully eight to 10 years from now.

As a dream, that's what we're aiming for

Internally, the goals are a little more aggressive -- (Laughter) (Chris) No.

Elon: This rocket looks really big compared to other rockets, but it's going to look like a rowboat to future spacecraft.

Future spacecraft will be really gigantic.

(Chris) Why Elon?

Why should we build a million cities on Mars in our lifetime? I think you said that's what you wanted to do.

Elon: I think it's important that we have an attractive and inspiring future.

I think you have to wake up in the morning and have a reason to want to live.

why do you want to live

what does that mean? What inspires you?

What do you long for in the future?

If we don't go out into space -- if we don't go out into the stars and become a race that lives on multiple planets -- I think that's a real shame, and I don't think that's our future.

(Applause) (Chris) People have a go-or-go view, and there are a lot of pressing issues happening on the planet right now, from climate to poverty to pick and choose.

And spaceflight feels like a distraction from the problem.

don't think about that

I think we should solve the problem here and now.

In all fairness, you've done a great deal with sustainable energy.

But why not just do that?

Elon: I see the future in terms of possibilities.

It's like a branching stream of possibilities, and the actions we take affect those possibilities, speeding up some and slowing down others.

I might introduce something new into that stream of possibilities.

sustainable energy will happen anyway

Even without Tesla, it would have happened out of necessity.

Although it is synonymous

If you don't have sustainable energy, you're using "unsustainable" energy.

Eventually it will run out, and the laws of economics will inevitably drive civilization toward sustainable energy.

The fundamental value of a company like Tesla lies in the degree to which it accelerates the advent of sustainable energy -- how fast we can make it happen.

When you think about what's fundamentally good about a company like Tesla, if they've accelerated the advent of sustainable energy by a decade or so, that's pretty cool.

I think that's what's good about Tesla's fundamental, aspirational side.

On the other hand, a race that lives on multiple planets, a civilization that lives in space,

not necessarily

It's important to acknowledge that this is not inevitable.

The future of sustainable energy is pretty much a certainty, but being a civilization living in space is far from certain.

If you look at the progress of space exploration, in 1969, we were able to send a man to the moon.

It's 1969

Then we got the space shuttle

We were just able to carry humans into low orbit.

When the space shuttle retired, America couldn't even carry people into orbit.

that's the trend

It's a trend that's descending into nothingness.

People mistakenly believe that technology will continue to advance in silence.

It's not automatic progress.

It's only when a lot of people work really hard to improve that it makes progress, and I think if you let it go it will deteriorate.

Look at great civilizations like ancient Egypt, where they could build the pyramids, but they forgot how to do it.

The Romans built an amazing aqueduct,

Even that was forgotten

CA: It's very interesting to hear what you have to say and to see all the things you've done that you have a unique dual motive for everything you do.

One is the desire to contribute to the long-term benefit of mankind.

The other is the desire to do something exciting.

And sometimes it looks like you need the other to push the one forward.

In Tesla's case, they wanted sustainable energy, and that's why they built that sexy, exciting car.

In the case of solar energy, we had to build that amazing roof to get there.

I haven't talked about your latest endeavor, and I don't have time to talk about it, but you want to save humanity from bad AI, and you're creating a fancy brain-machine interface that will give you infinite memory and telepathic abilities.

On Mars, they seem to think that we need a backup plan to save humanity, but at the same time we need to inspire humanity, and this is the way to inspire.

Elon: I think the value of beauty and inspiration is clearly underestimated.

I would like to clarify

I'm not trying to be someone's savior.

I'm just thinking about the future and trying not to be pessimistic.

(Applause) (Chris) Great words.

Everyone here will nod their heads that none of this is inevitable.

You're dreaming these things in your head, dreaming things that no one else dared dream, with a level of complexity that no one else could have dreamed.

I think the fact that you are doing that is really amazing

Thank you for helping us all dream bigger

(Elon) But if my dreams start to go completely insane, please let me know.

(Laughter) (Chris) Thank you, Elon Musk.

it was really great

(applause)

Coming out of college means investing 20 years.

When you grow up in a poor family, you don't think too far ahead.

What I think about is what to do with my next meal, how to raise the rent for that month.

In addition, my parents and my friends' parents seemed happy with their jobs as taxi drivers and janitors.

It wasn't until my teenage years that I realized that I didn't want to follow the same path.

But by that time, I had already completed two-thirds of my schooling, and it was almost too late to make up for it.

When you grow up in a poor family, you dream of being rich.

I was the same

I was born as the second of seven children in a single-mother household that relies on financial assistance, and was raised in Queens, New York.

Because of our low-income population, my siblings and I went to public school, which is considered one of the toughest schools in New York City.

I missed over 60 days in my seventh year of junior high school simply because I didn't want to go to school.

My high school had a 55 percent graduation rate, but to make matters worse, only 20 percent of the graduates had the academic ability to go to college.

When I finally got into college, I once told my friend Brennan, "My teacher always told me to raise my hand if I wanted to go to college."

I was taken aback by Brennan's reaction, "I've never been told that.

I'm always like, 'Which university do you want to go to? "It was"

If you ask me like that, it's impossible not to go on to college.

Recently I've been asked another question

"How did you get out of that situation?"

For years, I said, "I was just lucky," but luck isn't the only thing.

My brother and I graduated from high school at the same time, but my brother dropped out of two-year college.

It wasn't until I entered Cornell University as a scholarship fellow that I realized, for the first time, that growing up in a single-mother household that relied on financial assistance and going to the kind of school I went to really impacted my child's education.

That's how I finally understood the trajectory my brother followed.

I also learned that some of the most powerful figures in education reform, like former U.S. Secretary of Education Arne Duncan and Teach for America founder Wendy Kopp, had never been to a public school in a poor neighborhood like I had.

A lot of education reform is driven by sympathetic ideas, so it goes something like this: "Let's help the poor neighborhood kid, the black kid, the Latino kid." It's not a personal effort.

How I got through it, my answer now is, "One of the biggest reasons is that I didn't feel ashamed to ask for help."

In the average middle-class and wealthy class, when a child is in trouble, parents and teachers usually come to their aid, even if they don't ask for help.

But if you're a child from a poor family, if you don't ask for help, it's very unlikely that you'll get a helping hand.

The social safety net is practically non-existent.

So seven years ago, based on my own experience, I set out to reform the public education system.

I started with summer school

Studies show that two-thirds of the difference in academic achievement, the difference in academic performance between rich and poor children, black and white children, is due to learning losses during the summer vacation.

Children in low-income neighborhoods forget about three months' worth of what they learned during the school year over the summer.

So when I go back to school in the fall, I have to spend another two months re-teaching what I was taught before.

A total loss of 5 months

In America, there's only 10 months in an academic year.

If you lose five of those months each year, you're wasting half your school year.

it's half

If children went to school all summer, there would be no turning back, but traditional summer school is inadequate.

It was like a punishment for the children and a babysitter for the teachers.

But there's no way schools can prepare such an effective program, because it's the last week of June, and it's only a week away from the end of the school year and the start of summer school.

With that amount of time, it is impossible to find the right person, coordinate the operation, and create a curriculum that both children and teachers are enthusiastic about.

So what if we could create a summer program where teachers act as coaches and train future educators?

What if you had a college graduate who could be your role model and help your kids go to college as a teaching assistant?

What if you could have the best kids as mentors, and watch the underclassmen work, and inspire them to learn?

What if we gave every child the confidence to be a research student, ask them what college they want to go to, design a summer school that they want to go to, make sure they don't forget what they've learned over the summer, and eliminate two-thirds of the causes of inequality?

So far this summer, we've helped over 4,000 low-income children, trained over 300 aspiring teachers, and created over 1,000 seasonal workers in some of New York City's most disadvantaged neighborhoods.

(Applause) Our students are becoming successful.

Over the course of two years, a third-party evaluation found that the children were no longer falling behind in their summer studies, gaining a month's gain in math and two months' gain in reading.

So when you go back to school in the fall, you're not three months behind, you're four months ahead in math and five months ahead in reading.

(Applause) If I had been told 10 years ago, "You could graduate from an Ivy League college in the top 10 percent and improve the school system if you worked just two months a year." I would have said, "No way."

And what's even more exciting is that just by changing the way you spend your time for two months, you can avoid five months of delay.

thank you

(applause)

Hello everyone

nice to meet you here

Actually, that's exactly what I say to people who come to the La Crosse Public Library.

I say that because I really mean it

The children who come to the library are like friends, and we care about their needs and their future.

I wish you good luck and success

I hope you find a great book or a movie you enjoy.

It would be nice to find a solution to a difficult problem

Libraries generally get great ratings for supporting their communities.

The library's mission and founding purpose is to connect the community with the wider world.

Engage people and develop lifelong learners

These ideals are so important to libraries because we know that libraries have the power to make the world a better place.

It's a world that's more connected, more engaging, more empathetic.

Books have power, information has power.

Access to them is even more important for the powerless in the community.

In 1995, Betty Hart and Todd Risley published a study that found that working-class families and people on social welfare now experience what they call the "30 million word gap."

In other words, what this study found is that children in these families hear so many fewer words per day than others, that there is a large disparity in the language they learn by the age of three.

Language learning gaps persist in school, leading to slow literacy, poor reading comprehension, and poor academic performance.

Children need to hear words every day, not only in everyday conversations, but also in difficult words, words outside the common vocabulary of about 10,000 words.

I would like to read a short excerpt from a children's book by Eric Carle, one of the most popular authors in the children's book section.

Some of you may know "The Very Hungry Caterpillar"

This is an excerpt from "Slowly is full"

"At last the sloth replied, 'I am indeed slow and quiet and boring.

I'm absent-minded

Unfazed, lazy, calm, calm, slow, lethargic, calm, undisturbed, laid-back and carefree – I mean sloth!

i like to relax and be quiet and peaceful

But don't be lazy.' The sloth yawned and said, 'That's who I am.

I like to do everything slowly, slowly, slowly.” Even a very short example in one of our books shows that the author uses 20 words to communicate to children.

Now, we know that many families who come to the library -- many of our friends -- are struggling financially.

There are people who live in poverty, people who don't have enough food or safe shelter.

James, who comes after school, lives in a local shelter and doesn't read his age-appropriate books -- well, he probably hasn't.

There's a gap of 30 million words, and when you compare proficiency by the third grade, both are directly proportional to household income.

What responsibility do libraries have to address these disparities?

How can our friends become more successful, more educated, and one day become better citizens of the world?

The first is free and fair access to everything the library has to offer.

Books level the playing field because they allow children of all socioeconomic backgrounds to experience language.

The programs we offer in the library are based on five early literacy developments: play, sing, talk, read and write.

Programs for adults include computer classes and job assistance.

We also provide start-up support

We're doing a great job for the people in our community, and we're offsetting that by imposing fines and fees on our users.

Currently, the La Crosse Library has 10,000 patrons who are unable to check out library materials due to fines and fees.

If you look at the poorest neighborhoods -- where 82 percent of students are said to be in financial difficulty -- that's 23 percent of the people in the region.

This is a local story, but it's also true nationally.

In the nation's fined libraries, the poorest neighborhoods have the highest number of inaccessible people.

In fact, the Colorado State Library is so concerned about this that it released a white paper, making it clear that fear of fines keeps poor families from using the library.

A colleague of mine got into a cab in Atlanta last year and started talking to the driver about the library, as they often do.

When I was a kid, the driver liked the local library and used to go there a lot.

Now that I'm a mother of three, I tell them I can't let them get their library cards because they have strict deadlines.

"It's like a credit card that can't pay"

Meanwhile, other libraries are trying to get rid of fines, like San Rafael, when they eliminated fines for children, they saw a 126 percent increase in child pass applications in the first few months.

Without fear of being fined, people would line up to take advantage of what the library had to offer.

What is the library telling us?

Libraries have two different ideas.

Libraries, on the other hand, are advocates of democracy, saying they exist so that every citizen can learn for themselves.

It claims the power of early literacy education to reduce gaps in proficiency and language learning.

"The library is on your side," they say.

On the other hand, if you're financially struggling and make a mistake once -- a mistake that anyone here can make -- if your library bag stays in your house for a few weeks longer than it's supposed to, or if you lose a CD or spill coffee on a book, all of a sudden you're not on your side, because when you make a mistake, you pay for it.

I can't help it if I can't pay

I've been a librarian for a long time

Over the last few years, I myself have paid over $500 in late fees.

You wonder why, you work there every day and you know the system.

But like all my friends who come to the library, I'm busy and forgetful.

I've been fortunate enough to pay $500 over the last few years.

I could have paid for it, even if I wasn't happy to do so.

So how can we say that it's a fair and just service that those who can pay the fine can still use it, and those who make a mistake once can never use it again?

That's not true

So why do libraries continue to operate in a model that hits the most vulnerable users the hardest?

There are several reasons

Responsibility is one

Some people think it's the library's responsibility to teach responsibility.

And if there might be a non-monetary way, we haven't figured it out yet.

There's also the idea that communities are collectively sharing resources, so there's order.

It's not fair if someone else wants to watch the "My Little Pony" movie while I'm overdue.

And then there's the money reason

People in the community care about the library, and they don't want the service delivery to become unsustainable.

Fortunately, there are many ways to do all this without alienating the most vulnerable people.

Some libraries have adopted the Netflix model.

You might be familiar with this.

If you don't return it, you can't borrow it again, but if you return it, you won't be penalized.

can be borrowed again

Some libraries continue to impose penalties, but they are looking to offer patrons alternatives, such as having them bring canned food instead of money where they pay for food, and where they pay for books, reading in the library instead of fines.

In some libraries in Wisconsin, you can scrape off a scratch card that's handed to you at the counter and get a 10% to 20% discount on fines.

There is also a day of pardon.

Once a year on that day, if you return overdue books, you will be forgiven.

A library in San Francisco celebrated Amnesty Day last year and welcomed back 5,000 disabled patrons.

700,000 overdue books were returned that day.

Some of them were overdue for 100 years.

It may sound silly, but I know from experience that more people would rather leave the library than have the librarian scold them for something overdue.

As host Michael said, I've been a librarian for 15 years, but my mom hasn't been to the library in decades, because she lost her books when she was young.

These small steps are great

But that's not enough, because it's challenging users.

I had to go to the library on a certain date and time.

must have extra food

To read a book on the spot, you must be able to read and write.

If you want people to use the library again, simply remove the penalties.

You'd think I wouldn't mention a financial reason: the library needed operating expenses.

But we need to think a few things about the role fines play in library budgets.

First, fines have never been a stable source of income.

It's been fluctuating erratically, and in fact, it's been declining for decades.

Especially when a recession hits, so does our ability to pay.

So it's possible that many of the 10,000 friends who are disabled - they can't pay in the first place.

It doesn't hurt as much as it actually does when you say you want to get rid of fines.

Third, it may surprise you, but on average across the country, fines account for about 1.5 percent of a library's operating budget.

this may be a big amount

In large libraries and large library systems, the actual amount is likely to be higher.

But for many libraries, it's a cost savings they can afford.

Finally, and perhaps most importantly, collecting fines also costs money.

Considering all the ways in which fines are collected, notifying you about fines, services like envelopes, stamps, returns management services, even phone calls and emails, you need the library's budget.

Labor costs are a big expense for libraries.

Customer-facing staff stand at the counter explaining fines, and sometimes fighting over fines.

Eliminating all of these factors might actually save the library money by eliminating fines.

Or at least we could reconfigure staff hours to align with the library's raison d'etre.

The other thing I want you to understand is that fines don't do what you think they do.

The debate over fines -- whether they should be imposed or not, and the amount -- is nothing new.

It's a debate that has been going on for about 100 years.

It's the same as the overdue period for the previous book.

Many studies have found that the reason libraries impose fines is based on the strong belief that they can return books on time and increase efficiency, and there is no basis for that.

Basically, the reason there are fines is because we've been fined all along.

The best choice for your local library is to prioritize purpose.

If the community asks for it, so will the library.

When you get home today, go to your local public library and talk to the librarian, talk to your neighbors, talk to the library committee.

Talk about how reading and writing are important for everyone in your community.

Tell them that if libraries are truly open to all, they should abolish fines and embrace communities.

thank you

(applause)

In 1956, a documentary film by Jacques Cousteau won the Palme d'Or and the Academy Award.

It's a movie called "Le Monde Du Silence," and the Japanese title is "The World of Silence."

The title has the premise that the underwater world is quiet.

Now, 60 years later, we know that the underwater world is far from quiet.

Underwater sounds cannot be heard above water, but depending on location and time of year, underwater soundscapes can be as vibrant as a jungle or a rainforest.

Invertebrate fish like the giant shrimp and marine mammals all use sound.

We use sound to understand habitats, communicate, navigate, and find predators and prey.

They can also understand the state of the environment in which they live by listening to sounds.

For example the North Pole

The Arctic is considered a vast, inhospitable place, sometimes compared to a desert, because it's extremely cold, very remote, and covered with ice most of the year.

But for me, there's no place on earth I'd rather go to than the North Pole, especially when the days get longer and spring comes.

For me, the North Pole really exemplifies the disconnect between what you see on the surface and what's happening underwater.

The ice all around me is all white and blue, it looks cold and there's nothing there.

But when you hear the sounds underwater, the sounds you hear will at first surprise you -- and then delight you.

All I see is nothing but miles of ice, but I know from the sounds I hear that there are bowhead whales, beluga whales, walruses and bearded seals.

ice also makes sounds

A shrill squeak, a crack, a burst, a roar as they collide and rub against changes in temperature, current and wind.

Bowhead whales sing under 100% sea ice in frigid winters.

You wouldn't expect that, because we humans are very visual creatures.

Many, if not all, people rely on vision to navigate the world.

For marine mammals that live in the water, chemical cues and light don't travel well, so they "see" through sound.

Sound travels much better in water than it does in air, so signals can be heard at great distances.

This is especially important in the Arctic, because Arctic marine mammals need to listen not only to each other's sounds, but also to environmental cues to see if thick ice or ice-free water is ahead.

Think about it, even though we spend most of our time underwater, we're mammals, so we need to come to the surface to breathe.

It is thought that they may use sound to locate thin or ice-free areas, or they may hear the echoes of nearby ice.

Arctic marine mammals are surrounded by the rich and diverse sounds that exist in the water.

In spring, various sounds are jumbled and chaotic.

(Sounds of marine mammals) But when the ice is completely frozen, and there are no major fluctuations in temperature or currents, the underwater ambient sounds in the Arctic are among the quietest in the world's oceans.

But this is changing

This is largely due to the loss of seasonal sea ice, which is a direct result of human greenhouse gas emissions.

We are, in effect, conducting a completely uncontrolled experiment on the planet with climate change.

Over the last 30 years, the Arctic has seen its ice cover fall by more than six weeks a year, and in some places by as much as four months.

A decrease in sea ice is sometimes referred to as an increase in the open ice season.

That means it's the season when ships can navigate the Arctic.

And not only is the extent of sea ice changing, but so is the age and thickness of the ice.

You may have heard that the loss of seasonal sea ice is causing habitat loss for animals that depend on it, such as seals, walruses, and polar bears.

Loss of sea ice is also increasing coastal erosion in coastal villages and changing food availability for seabirds and mammals.

Climate change and shrinking sea ice are also changing the underwater soundscape of the Arctic.

What is a "soundscape"?

Those of us who have a job that listens to the sounds of the ocean use a tool called a hydrophone, which is an underwater microphone.

Soundscapes represent the different things that make up this collection of noise.

What you're hearing from the hydrophone is the compelling sound of climate change itself.

This fluctuating sound comes from three different spaces: from the air, from the water, and from the land.

First is the sound in the air.

When the wind hits the surface of the water, it creates waves

Waves create bubbles, bubbles pop, and when bubbles pop, they make a sound.

Sounds like "whoosh" or "whoosh" that can be heard in the distance are closer

When the Arctic is covered in ice, the sound of wind doesn't reach the water because the ice acts as a buffer between the atmosphere and the water.

This is why ambient sound levels in the Arctic can be so low.

Not only is the Arctic now exposed to the sound of these waves because of the loss of seasonal sea ice, but the number and intensity of local storms is increasing.

All of this is raising the noise level of the once-quiet ocean.

Next is the underwater sound.

With less seasonal sea ice, subarctic organisms are migrating further north and taking advantage of the new habitats created by the widening water surface.

Bowhead whales, for example, do not have dorsal fins because they evolved to live and swim in ice-covered waters, and having a hump on their backs prevents them from navigating under the ice, and they may not survive in ice.

But now, wherever you hear underwater sounds, you can hear fin whales, humpback whales and killer whales farther north, even in the colder months.

So this is the sound of a subarctic invasion into the Arctic.

I still don't know what this is

Will there be a battle for food between arctic and subarctic creatures?

Do subarctic organisms bring disease and parasites to the Arctic?

How do the new sounds that these creatures bring affect the underwater soundscape?

The third is sound from the land.

What is land

that is human

More water means more human use of the Arctic.

Just last summer, a giant cruise ship passed through the Northwest Passage, once a legendary sea route between Europe and the Pacific.

Less sea ice will allow humans to move in and out of the Arctic more frequently.

It has led to increased oil and gas exploration and extraction, expanded potential as a freight route, and a growing tourism industry.

We know that the sound of ships can raise stress hormones in whales and disrupt foraging behavior.

Air guns emit a loud, low-frequency "boom" every 10 or 20 seconds that alters a whale's swimming and vocalization patterns.

All these sources are reducing the acoustic space in which Arctic marine mammals can communicate.

Arctic marine mammals are accustomed to increased noise at certain times of the year.

But their sources are mainly other organisms and sea ice, and they've evolved with these sounds, and these sounds are essential to survival itself.

New sounds, on the other hand, are loud and unfamiliar.

There are some effects that these sounds can have on the environment that we think we understand, and some that we don't.

Again, hearing is the most important sense for these animals.

Not only is the physical habitat in the Arctic changing, but so is the acoustic habitat.

It's as if the animals were plucked out of the quiet countryside and brought into the big city during rush hour.

animals can't escape

So what can we do now?

We can't slow down the winds, we can't stop the northward migration of subarctic animals, but we can work on the ground to reduce human-made underwater noise.

One solution is to slow down the speed of ships crossing the Arctic Circle, because the slower the ships, the quieter they travel.

Access to such areas could be restricted during seasons that are important for breeding, foraging and migration.

We can also improve the way we explore the seafloor by making ships quieter.

The good news is that there are people working on this problem right now.

But ultimately, it's imperative that we, as humans, make the effort to reverse, or at least slow down, human-caused atmospheric change.

Let's go back to the idea of ​​a quiet underwater world.

It's entirely possible that many of the whales swimming in the Arctic today, especially if they're long-lived species like bowhead whales -- the Inuit say they "live as long as two people" -- could have been alive in 1956, the year Jacques Cousteau made the movie.

In retrospect, considering the amount of noise we humans are making under the sea today, it may have truly been a "world of silence" back then.

thank you

(applause)

A few days after my husband, Paul, was diagnosed with stage 4 lung cancer, we were lying in bed at home, and Paul said, "I'm sure you'll be fine."

I remember saying, "Well, you just don't know what 'okay' means."

Paul and I met when we were both first year medical students at Yale University.

He was smart, kind, and very funny.

They have a gorilla suit in the trunk of their car and they say, "For emergencies."

(Laughter) As I watched Paul interact with his patients, I fell in love.

He stayed up late in the hospital talking to patients, trying to understand the experience of illness, not just a technical understanding.

Later, he told me about the moment he fell in love with me, when he saw me scream and cry on the heartbeat-stopping electrocardiogram.

I didn't realize it at the time, but even when we were happy and loving, we were learning how to relate to the suffering of our patients.

we got married and became doctors

Around the time I was working as a physician and Paul was completing his training as a neurosurgeon, he started to lose weight.

I started suffering from excruciating back pain and a persistent cough.

And when I got to the hospital, a CT scan showed tumors in my lungs and bones.

We've both taken care of patients with serious diagnoses, and now it's all our business.

We went through a 22-month battle with the disease.

In his memoirs, he wrote about his feelings in the face of death.

I gave birth to my daughter, Kady, and we loved her and each other.

I learned firsthand how to make agonizing and very difficult medical decisions.

The last time I put Paul in the hospital was the hardest day of my life.

He finally turned around and said, "I'm ready." I knew it wasn't just a brave decision.

it was the right decision

Paul didn't want a ventilator and CPR.

At that moment, the most important thing for Paul was to hold his baby daughter.

Nine hours later, Paul passed away.

I've always thought of myself as a provider of care, as most doctors are, but caring for Paul made that even more meaningful.

Watching him reshape his identity in his illness, learning to be present in his pain, and discussing his choices with him, has taught me that resilience isn't about being who you were before, or pretending that hard things aren't hard.

It's very difficult to be sick

It's painful and messy

But that's how it is

What I've learned is that if you go through it with someone else, you can decide for yourself what's good for you.

One of the things he said soon after his diagnosis was, "I want you to remarry someone."

I say "wow" and say anything

(Laughter) It's so shocking and heartbreaking...

I found it to be generous, and I found it very comforting, because I realized that what he said was so candid, and that candor was exactly what we needed.

Early on when we found out he was ill, we decided to speak up and talk about everything.

Things I'd avoided all along, like writing a will and completing an advance directive, weren't as daunting as I thought they would be.

I realized that completing an advance directive is a love affair, like a marriage vow.

It's a vow to care for each other, and you codify that promise to stay by your side until death do us part.

Be your advocate if you need to

I will respect your wishes

Those papers gave shape to our love story.

As doctors, Paul and I were in a position to understand and accept his diagnosis.

Luckily, I wasn't offended, because I've seen so many patients in heartbreak, and I know that death is part of life.

But it's also important to know that actually living through the sadness and uncertainty of a serious illness is a very different experience.

By now, we've come a long way in treating lung cancer, but we knew that Paul's life expectancy was months or years.

During that time, Paul wrote about his transition from doctor to patient.

He talked about how suddenly he felt like he was at a crossroads, and how he thought that he had treated so many patients that he knew where he was going, and that he could follow in his footsteps.

but he was lost

Instead of a path, he wrote, "Instead, all I saw was a desolate, empty, glistening white desert.

It was like a sandstorm drowned out everything familiar

I had to face my death and try to understand what makes life worth living, and I needed the help of a cancer specialist."

Seeing the medical staff who took care of Paul made me deeply aware of the true value of us medical workers.

our job is hard

We have a responsibility to help patients better understand their prognosis and treatment options, and it's never easy, it's hard, especially when dealing with a life-threatening disease like cancer.

Some people don't want to know how long they live, some people want to know

Either way we don't have the answer

Sometimes we give you hope by highlighting what works best.

In one survey of physicians, 55% of respondents said that when explaining the prognosis to their patients, they gave a more positive outlook than an honest opinion.

it comes from instinctive kindness

But researchers found that better understanding of the possible consequences of illness led to less anxiety, more planning, and less trauma to families.

Families may find these conversations highly conflicting, but we've found such information to be very useful when making big decisions.

Most notably when deciding whether to have children.

With Paul's life expectancy of a few months to a few years, we probably won't see him grow up.

But I think I'll be able to witness the birth of a child and the beginning of life.

I remember asking Paul if he thought death would be more painful if he had to say goodbye to his children.

his answer surprised me

I said, "Wouldn't it be great if that happened?"

so i had a baby

Not to deal with cancer, but because I was learning that to live fully was to accept suffering.

Paul's doctor customized his chemotherapy regimen so that he could continue to work as a neurosurgeon, something that at first seemed completely impossible.

When the cancer progressed and Paul transitioned from being a surgeon to writing, his palliative care doctor prescribed psychostimulants to help him focus more.

The doctors asked Paul what his priorities and concerns were.

I asked Paul what he prioritized and what he could give up.

Such conversations were the best way to ensure that medical care and values ​​were matched.

Paul joked that it's not a "sex education" talk with a parent. When you talk to your parents about it, you try to get it over with as quickly as possible and pretend it never happened.

But this conversation repeats itself as circumstances change.

And you can keep talking out loud

I was really happy, because Paul's medical staff saw their job as talking to Paul about painful choices, not just trying to give them answers they didn't know or trying to remedy the situation.

His physical condition is deteriorating, but his will to live remains intact.

Later, after Paul passed away, I received about ten bouquets of flowers, but I only received one...

I gave it to Paul's doctor because she supported his goals and helped him consider his options.

She knew that living wasn't just about surviving.

A few weeks ago a patient came to my clinic.

A woman with a serious chronic illness

As we discuss her life and medical care, she said, "I love the palliative care team.

He taught me that I can say no."

Of course you can say

But many patients don't feel that way.

Compassion & Choices conducted a study that asked people what kind of care they preferred in their health care.

Many people's responses began with the words, "If I had a choice..."

if you can choose

There's something about the "if" that makes a lot of sense to me: why one in four people is receiving excessive or unwanted treatment, and why I've seen family members undergo such treatment.

It's not because doctors don't know

we know

We understand the real impact of treatments on patients and their families.

In fact, it also deals with mental health care.

Half of critical care nurses and a quarter of intensive care physicians say they've considered quitting because they're worried that their care doesn't align with their values.

But doctors can't really respect their patients' wishes if they don't know what they want.

If you could live longer, would you prefer to be on life support?

Is quality more important than length of time left?

Both of these choices are wise and brave, but they must be chosen by everyone.

It's true at the end of life, and it's true in receiving medical care throughout life.

Would you want genetic screening if you were pregnant?

Do you think knee replacement surgery is a good thing?

Do you want to have dialysis at a medical institution or at home?

The answer is - it's up to you

What kind of medical care will help you live the way you want?

Remember that question for when you have to make a decision about your care.

Remember, you always have options, and you can say no to treatments that don't suit you.

There's a poem by W.S. Merwin, it's just two sentences, and it captures how I'm feeling right now.

"Your absence pierced me like a thread through the eye of a needle.

That color is sewn into everything I do."

For me, this poem evokes my love for Paul and the new fortitude that comes from loving and losing him.

When Paul said, "You'll be fine," he didn't mean you could be cured.

Instead, we've learned to embrace joy and sorrow at the same time, and what we've discovered is beauty and purpose.

No matter how sad and sleepless nights continue, I realize that there is joy.

I put flowers on Paul's grave and watch my two-year-old daughter run around in the grass.

Have a bonfire on the beach and watch the sunset with friends

Exercise and mindfulness meditation helped a lot.

and i want to remarry someday

Most importantly, I get to see my daughter grow up with my own eyes.

I've already thought a lot about what to say to her when she grows up.

"Kady - experience things to the fullest, life and death, love and loss - that's what we can do.

Rather than "being human in suffering"

"Become Human in Suffering"

If you face your pain with someone else, if you choose not to hide behind it, life will not diminish, it will expand.”

Having cancer is not necessarily fighting

Or even so, we're fighting something different than we thought.

What we should do is not to fight fate, but to help each other through it.

Not as a soldier, but as a spiritual leader.

That's how we'll be okay, even when we're not okay.

By saying it out loud, by helping each other to get through...

Also, it might be nice to have a gorilla costume

thank you

(applause)

Chris Anderson: Robert has been thinking a lot lately about how strange human behavior is, and how we still haven't been able to explain it very well.

For the first time, he will present part of his research in front of everyone.

I'm Robert Sapolsky

(Applause) Robert: Thank you.

The fantasy always unfolds like this

I'll kill the Nazi SS and run into his secret bunker with a machine gun

He reaches for his pistol in a hurry

When I brush the pistol out of his hand

He reaches for the cyanide in a hurry

i pay it off too

He growls and comes at me with tremendous force

We wrestle and fight

They say, "Adolf Hitler, you are under arrest for crimes against humanity."

The Medal of Honor fantasies end here, and then they get more gruesome.

What will you do with him you caught?

It's easy once you start imagining

cut off the neck

gouge out one's eyes with a blunt instrument

puncture the eardrum cut the tongue

Keeping him alive on a respirator, feeding him by tube, depriving him of speech, motor function, sight and hearing, leaving only the senses, then injecting him with cancerous substances, the skin becomes sores and covered with pustules, and soon the cells of his body scream in pain, every second feels like eternal hell to him—

Let's make Hitler look like this

That's been a dream I've had since I was a kid, and I still fantasize about it now and then, and it makes my heart beat faster as I ponder all the ways that I've dealt with one of the most evil souls in history.

But there's a problem. I don't really believe there is a soul or evil.

There are some people who would rather just be killed, but they are against the death penalty.

I like sleazy violent movies, but I'm in favor of tighter gun control.

But I've also had a lot of fun playing laser gun survival games and picking people out of the shadows.

So I'm just a normal person, and I don't have a consistent view of violence.

We as a species clearly have a problem with violence.

From pouring poison gas out of showerheads, sending letters containing anthrax, using airplanes as weapons, and gang raping in military campaigns.

we are a pathetically violent species

Things get complicated because we don't hate violence, we hate the abuse of violence.

We cheer, we celebrate, we vote, we endorse violence when it's done right.

we love righteous violence

Another complication is that we humans are not only such a pitifully violent species, but we are also an extraordinarily altruistic and compassionate species.

So how do we understand the best human behaviors, the worst behaviors, the ambiguous behaviors in between, all of them biologically?

Let's start by trying to understand behavior, albeit quite boring, in a kinematic way.

When the brain gives commands to the spinal cord and muscles, humans perform their actions admirably.

The tricky part is understanding the meaning of the action. Sometimes pulling the trigger is a terrifying act, sometimes it's heroic self-sacrifice.

Sometimes it's a deep kindness to put your hand on someone's hand

It can be a deep betrayal

The hard part is understanding the biological context behind the behavior, which is really messy.

But one thing is clear: no one brain region, no hormone, no gene, no childhood experience, no evolutionary mechanism can explain everything.

Instead, every action has a multi-layered reason.

Let's look at an example

you're holding a gun

There's a crisis going on around us, there's rioting, there's violence, there's people running around.

A stranger comes running towards you in a state of agitation, frightened, threatening, angry, you can't tell from the expression on his face, but he seems to be holding some kind of pistol.

not clear

When the person finally approaches you, you pull the trigger.

But what he had in his hand was a mobile phone.

So I asked the biological question, "What happened to cause this behavior?"

"What caused this behavior?"

this contains a lot of questions

first question

"What was going on in your head one second before you pulled the trigger?"

To answer this question, we need to think about a region of the brain called the amygdala.

The amygdala controls violent behavior and fear, relays information and triggers.

"What was your amygdala activity level one second ago?"

To understand this, we have to go back in time a little bit.

"What happened in your environment, seconds or minutes ago, that affected your amygdala?"

Of course, the presence of the sights and sounds of the riot is conceivable.

But it's even easier to mistake a cell phone for a handgun when the stranger is male, large, and biracial.

And when you're in pain, or you're hungry, or you're tired, the frontal cortex doesn't work as well.

here we have to go back in time

Now let's look at hours and days ago, and we're going to look at hormones.

Testosterone, for example, regardless of gender, elevated levels of testosterone in the blood tend to make other people's expressionless faces look threatening.

High levels of testosterone and stress hormones make the amygdala more active and the frontal cortex less active.

And if you go back a few weeks or even a few months, it becomes relevant

It's an area of ​​neuroplasticity. The brain can change in response to experience. After months of stress and trauma, the amygdala will expand.

Your neurons will be more excitable than normal, your frontal cortex will be atrophied, and all of this will affect what happens in that moment.

Let's go back many years, let's say adolescence.

Now, what's important about the adolescent brain is that even though it's at full capacity, the frontal cortex is still immature.

The frontal cortex finally matures around the age of 25.

So adolescence and early adulthood are periods when the environment and experiences are working on the frontal cortex to shape the brain that the crisis situation requires of the adult brain.

And if you go even further back in time to infancy and fetal life, there are many different changes that can occur in the brain during this period.

Now, of course, this is the brain's formative period, and that's important, but what's important to note is that experiences during this period result in so-called epigenetic changes, which can be permanent, activating certain genes and deactivating others.

As an example, if you're exposed to a lot of stress hormones during fetal life through your mother, you'll experience epigenetic changes that later in adulthood make your amygdala more excitable and stress hormone levels higher.

And we go further back in time to when we were in our mother's womb, when we were just a bunch of genes.

Now, genes are very important, but they don't exactly determine what a gene is, because they do different things in different environments.

To give you a key example, there's a genetic variant called "monoamine oxidase A." People with this genetic variant are much more likely to commit antisocial violence, but only if they've been abused as children.

Genes and environment interact in such a way that what happens just before the trigger is pulled reflects a lifetime of gene-environment interaction.

Now, it may surprise you, but let's go further back in time, many centuries.

what did your ancestors do

Nomads, for example, were people who lived in deserts and grasslands, living with herds of camels, cattle, and goats, and probably built a culture of honor, with multiple classes of warriors, retaliatory violence, and inter-clan rivalry.

And let's go back in time, millions of years ago, because when we talk about genes, we also implicitly talk about genetic evolution.

So what you see here, for example, is the pattern for each species of primate.

Some species have evolved to be extremely less aggressive, while others have evolved in the opposite direction. Hovering in the middle on every scale is humans. This elusive, incoherent species. Humans can swing either way.

So what do we learn from all of this?

Basically, what we've learned is that if you want to understand an action, whether it's a horrible action, an amazing action, or an indistinguishable action in between, if you want to understand that action, you have to take into account everything that happened one second to a million years ago, and everything in between.

What is the conclusion?

What I can tell you clearly is that behavior is complex.

It's obvious

Because it's complicated, you should think very, very carefully before assuming the reasons for the actions you're looking at with a harsh critical eye.

So far, the most important point for me is change.

Any of the biological findings I've described here can change in different situations.

For example, ecosystems change

Thousands of years ago, the Sahara Desert was a lush grassland.

culture changes

In the 17th century, the most fearsome people in Europe were the Swedes, who were rampaging across Europe.

This is the Swedish army today

200 years without a single war

Most importantly, the brain changes.

neurons develop new processes

conventional circuit is disconnected

Everything in your brain changes, and amazing changes happen from here.

The first example is a man named John Newton, an English theologian who played a central role in the abolition of slavery in the British Empire in the early 1800s.

The amazing thing is that this man spent decades as a slave ship captain when he was young, and then he made his fortune investing in the slave trade.

then something changed

Something changed in him, and he celebrated the change himself in his most famous Newtonian hymn, "Amazing Grace."

This is a picture of a man named Zenji Abe on the morning of December 6, 1941, as he was heading to Pearl Harbor as a Japanese bomber company commander.

This is him 50 years later, hugging an American man who survived an air raid.

In old age, Zenji Abe attended a local ceremony attended by survivors of the attack on Pearl Harbor and apologized in broken English for his actions in his youth.

It doesn't always take decades

Amazing changes can sometimes occur in just a few hours.

1914 Consider the Christmas truce during World War I.

The leaders of both armies had negotiated a brief ceasefire to force their soldiers to retrieve the bodies from the halfway point of the camp.

Soon the British and Germans set to work, but gradually they helped each other to carry the bodies, and eventually they dug a grave in the frozen earth, prayed together, and then spent Christmas together, exchanged gifts, and the next day played soccer together, and exchanged addresses so that they could meet again after the war.

This truce lasted until officers arrived and said, "If you don't start killing each other, I'll shoot you."

In just a few hours, these soldiers have created a whole new "we". The "us" in the trenches, split on two sides, are dying needlessly. Meanwhile, the "them" are the faceless powers who don't go to the front lines and treat themselves like chess pieces.

And sometimes changes can occur in seconds.

The My Lai massacre was perhaps the most horrifying event of the Vietnam War.

A unit of the U.S. military invaded a village filled with unarmed civilians and massacred between 350 and 500 villagers, women and children were gang-raped and mutilated.

it was a terrible incident

Not only because the incident happened, but because the government denied it, because the U.S. government ended up with lukewarm punishments, and there were almost certainly other similar incidents.

Hugh Thompson, he's the one who stopped the Lai Mi village massacre.

He was piloting an armed helicopter, and when he landed and came out, he saw American soldiers shooting at babies and old women. Realizing what was going on, he climbed into the helicopter and let go of the concept of "we" and "them" that had been ingrained in him all his life.

He landed the helicopter between the surviving villagers and the American soldiers, turned his machine guns on his fellow Americans, and said, "If you don't stop killing, I'll shoot you all."

Now, these people are nothing special, just like us.

Same neurons Same neurochemicals Same biology

What we should be thinking about here is the phrase, "Those who don't study history are repeating history."

our words are the opposite

Human history has undergone an astonishing transformation, and we cannot repeat these glorious and sublime moments without learning the biological factors that transform us from the worst to the best.

Thank you

(Applause) Chris: One of my favorite TED talks is one that gives you a new mental model of something, and this was one of those talks.

thank you so much robert good luck with your writing

It was a great talk, and I hope you'll be able to visit us someday.

thank you

Robert: Thank you everyone.

If you take an everyday item, like a coffee cup, break it in half, and keep breaking it in half, where does it end up?

Can it continue indefinitely?

Or will we find the indivisible basic elements that make up all things?

Physicists have discovered the latter, that matter is made up of elementary particles called subatomic particles, which are the smallest particles in the universe.

Elementary particles interact according to the "standard model" theory

The standard model is a very concise and comprehensive description of the strange quantum world of tiny particles that can't be divided any further.

It also explains the forces that govern how particles move, interact and bond together to shape the world around us.

How does that work?

If you zoom in on the coffee cup fragment, you can see a molecule made up of atoms bonded together.

Molecules are the smallest units of chemical substances

An atom is the smallest unit on the periodic table of elements

But atoms are not the smallest units of matter.

Experiments have shown that each atom has a very small, close-packed nucleus surrounded by an even smaller cloud of electrons.

As far as we know, the electron is one of the basic building blocks of the universe, which cannot be divided any further.

It was the first particle in the standard model to be discovered.

electrons are bound to the nucleus by electromagnetism

They attract each other by exchanging subatomic particles called photons, which are the quanta of light that mediate the electromagnetic force, one of the fundamental forces in the standard model.

Since the nucleus contains protons and neutrons, there are still more mysteries to solve.

In 1968, once thought to be elementary particles, physicists discovered that protons and neutrons are actually made of quarks, which cannot be divided any further.

A proton consists of two up quarks and one down quark.

A neutron is made up of two down quarks and one up quark.

The nuclei are held together by "strong forces," which is another fundamental force in the standard model.

In the same way that photons mediate electromagnetic forces, subatomic particles called gluons mediate strong forces.

An electron, plus an up quark and a down quark, would seem to be enough to make an atom, to explain ordinary matter.

High-energy experiments have shown that there are actually six types of quarks: Down & Up, Strange & Charm, Bottom & Top, and that their masses are very different.

Something similar was found with the electron, where it had two heavier siblings, the muon and the tau.

Why does each elementary particle have three (and only three) relatives?

this remains a mystery

These heavy particles are produced only briefly during high-energy collisions and are not seen in everyday life.

This is because it quickly decays into lighter particles.

Collapse also involves the exchange of force-carrying particles, called W and Z particles, which, unlike photons, have mass.

It mediates the one remaining force of the standard model, the weak force.

This weak force exchanges protons and neutrons for each other, a key component in the nuclear fusion reactions that power the sun.

Direct observation of W and Z particles required high-energy collisions with particle accelerators.

There's another kind of elementary particle in the standard model, the neutrino.

interacts with other particles only by weak forces

Trillions of solar-made neutrinos pass through our bodies every second.

Weak interaction measurements have shown that there are different types of neutrinos associated with electrons, muons, and tau particles.

These particles have antimatter, which is exactly the same matter, except that they have the opposite charge to antimatter.

Matter and antimatter particles form in pairs during high-energy collisions and annihilate each other when they meet.

The final particle in the standard model is the Higgs boson, which is a quantum ripple in the energy field of the vacuum of the universe.

According to the Standard Model, this interaction with the field is how all the elementary particles that make up matter gain mass.

The ATLAS detector, installed in the Large Hadron Collider, is studying the Standard Model in detail.

By precisely measuring the particles and forces that make up the universe, ATLAS physicists can search for answers to mysteries that the Standard Model can't explain.

For example, how to incorporate gravity into the model?

What is the relationship between the particles that mediate force and the particles that make up matter?

Can you explain "dark matter"? It's the unexplained matter that accounts for most of the mass in the universe.

The Standard Model does a great job of explaining the world around us, but the universe still holds many mysteries worth solving.

Last year, I gave a seven-minute talk about Project Orion, which was a pretty incredible technology, but it was technically possible and politically possible over the past year.

In the end, it became an unfulfilled dream without being realized.

This year, I will tell you the story of the birth of digital computing technology.

it was the perfect start

It worked, it happened, and this machine is everywhere now.

A technology born out of necessity

If these people don't do it, maybe someone else did.

So it was the right idea at the right time.

This is Barrichelli's world, and it's the world we live in now.

Machines are doing everything, even changing biology.

I'm going to start with the story of the first atomic bomb, called Trinity, in the Manhattan Project, which was kind of like TED, attracting a lot of good people.

The three that stood out were Stanislaw Ulam, Richard Feynman and John von Neumann.

After testing the atomic bomb, Neumann wrote, "I'm a computer thinking about things much more important than bombs."

And he didn't just think about it, he built it. This is the machine he built.

(Laughter) He built this machine, and he did a great job of demonstrating that this idea could be done. The idea of ​​computers goes way back.

It was first described by Thomas Hobbes, who showed in 1651 that arithmetic and logic were practically the same, and that if you wanted to achieve artificial thinking and logic, you could do it with arithmetic alone.

It says that what you need is addition and subtraction

Leibniz showed a little later, in 1679, that even subtraction was unnecessary.

All this can be done by adding

It's about binary arithmetic and logic that led to the computer revolution later.

Leibniz was the first to write about computer construction.

I'm talking about marbles and gates, but this is the equivalent of a shift register that opens the gate and drops the marbles down the path.

Apart from the marble turning into an electron, this is the same thing that any calculator does.

Time passed and von Neumann reinvented the exact same thing in 1945.

After the war ended in 1945, electronics continued to work on building such machines.

In June of 1945, before the atomic bombs were dropped, von Neumann had put together the theory needed to build a computer, and as far as theory goes, Turing had shown in the previous era that all computations could be done by a tiny finite state machine that could read and write tapes.

Another thing that motivated what von Neumann did was the difficulty of forecasting the weather.

Louis Richardson devised a method of arranging a large number of people in an orderly fashion, assigning each person a small task, and then summarizing the work.

This is an electrical model of the mind with a will, but there are only two kinds of thoughts.

(Laughter) This is just the simplest computer.

We need a qubit, because we only have two thoughts.

By accumulating a lot of these, we can realize the basic structure of a modern computer: an arithmetic unit, a central control unit, a memory storage medium, an input/output device.

But there's one big pitfall, which I realized when I tried to write a program.

Instructions that control operations must be specified down to the smallest detail.

A program doesn't work unless it's perfect

If you look at the origins of computers, the typical historical literature is that ENIAC is where it all came from.

The machines I'm going to talk about, the IAS machines you see above, should really be written in the first place.

Computers like this have opened up a whole new world that extends beyond any device.

it's the world they dreamed of

RCA's Vladimir Zworykin, in the middle of the photo, was supposed to build that machine.

RCA decided not to get into the computer business, probably the worst business decision in history.

The first meeting took place at the RCA in November 1945

RCA embarked on this whole project, but decided that television, not computers, was the future.

I had everything I needed to build and run the machine.

Von Neumann, logicians, military mathematicians, we needed a place to build.

RCA turned me down, so I decided to make it in Princeton at the lab where Freeman Dyson worked.

I spent my childhood there

It's me and my sister, Esther, who spoke earlier, and we were both at the birth of the computer.

This is old Freeman, and I am too.

Von Neumann and Morgenstern, the creators of game theory.

This brilliant talent was gathered at Princeton

Oppenheimer developed the atomic bomb

In fact, this machine was primarily used for calculations for bombs.

Julian Bigelow was hired as an engineer, and he figured out how to use electronics to actually build machines, and that's the people who came together for this job.

they are archetypes of geeks

I wasn't familiar with the organization.

This is a letter from the director, accusing him of the unfairness of the sugar problem.

(laughs) You can read the text.

"...the amount of sugar consumed by your staff is several times higher than other departments...I suggest you drink tea here at 5pm under proper supervision..." This is the first example of a hacker causing trouble.

(smile)

they are not theoretical physicists

People who make real things with soldering irons

We take it for granted that a computer with billions of transistors can reliably perform billions of operations every second.

What they were using was a radio vacuum tube, which had been ill-conceived to operate in two states.

I used 6J6, a common radio tube, because it was more reliable than the more expensive tubes.

They published the whole process of development that they did in the laboratory

A report was published and duplicate machines were built in 15 locations around the world.

This was the very prototype of the microprocessor.

Every modern computer is a duplicate of this machine

The memory was made with a cathode ray tube, and it used a lot of dots on the surface of the cathode ray tube, and it was unstable and susceptible to electromagnetic waves.

40 such cathode ray tubes are arranged and the memory operates like a V-40 engine

(Laughter) At first, we used teletype tape for input and output.

here is

A wire drive using a bicycle wheel, the prototype of a hard disk.

After this it will be replaced by a magnetic drum

This is an improved IBM device that was later taken over by IBM and created the data processing industry.

This is the origin of computer graphics

"Graphing Beam Turn On." This was the first digital bitmap display I know of, from 1954.

Von Neumann had already stepped away from the world of theory, doing abstract research into how reliable machines could be made from unreliable parts.

This is a log written by these guys who use a lot of sugar as they struggled to get the machine working, and they used 2,600 tubes that were constantly failing.

I've been poring over my journals for the past six months.

"Execution time: 2 minutes, input/output: 90 minutes"

There is also a lot of human error here

So they were always trying to figure out if it was machine error or human error.

Which are soft errors and which are hard errors

'Engineer looking at CRT 36' trying to find out why memory is out of focus

You have to focus your memory. "No problem."

For the memory to work, each tube had to be focused, and it wasn't just the software that was the problem.

"It's completely broken." (laughs) "I don't know how to do it. Where are the instructions?"

It seems you were already frustrated with the manual. It says "Before you get fed up and stop."

I literally burned oil and worked late into the night

MANIAC (Mathematical Numerical Integrator and Arithmetic) is the abbreviation for this machine.

"MANIAC restores the contents of memory when the power is turned off." "Machine or person?"

"Yeah!" I finally figured out there was a problem with the code

"There was a problem with the code, I hope so."

"Machine not guilty of code error"

"Damn, maybe I'm just as hard-headed as this guy."

(Laughter) "And then dawn came." You've been doing it all night.

The machine worked 24 hours a day, mostly doing bomb calculations.

"Everything I've done so far has been a waste of time." "Nothing good. Good night."

"The main power is off, you're a big mistake!!" (laughs) "The air conditioner is not working properly.

"Don't turn on the power without a short-circuited operator!"

"There's something like tar on the card of the IBM machine. It's from the ceiling."

I was working in a very harsh environment.

(Laughter) "Mouse crawled into the blower Behind the regulator base Move the blower Result: No more mice, never again."

(Laughter) "The mouse sleeps here Birth-Unknown Death-May 19, 1953 4:50 am."

(Laughter) There's an inside joke, "Marston Mouse sleeps here."

If you're a mathematician, you know Marston Morse, the mathematician who was against this computer.

"I removed fireflies from the drum." "Running at 2 kilocycles."

Clock frequency is 2000 "I'm a coward" - 2 kilocycles was slow

16 kilocycles at high speed

Even the Macintosh II was 16 megahertz This is a slow illustration

"I got two answers, but which one is correct?

It's just a matter of which one is correct."

"Three different answers

I knew it was incomprehensible."

(Laughs) "The error was reproduced before."

"Machine works fine, code doesn't"

"It only happens when the machine is running"

sometimes it works

"Oh machine, beautiful things, eternal joy" "☆perfect operation☆"

"Final word: when a bigger error can happen, it happens."

I didn't know it was being used for bomb development.

It was used to develop the hydrogen bomb, but late one night, a picture of the bomb finally appeared in the diary.

The result is this thing called Mike, the first thermonuclear bomb dropped in 1952.

This was developed in the woods behind the lab using that machine.

von Neumann recruited oddballs from all over the world to tackle various problems.

Barrichelli came in to work on what we now call artificial life, working in this artificial world.

he was ahead of his time in some ways

We've started working on a computer-powered artificial genetic system.

His world was born on March 3, 1953

It will be exactly 50 years next Tuesday

He was looking at everything through the code... he could just read the binary code of the machine output.

I used the machine really well.

Even if other people didn't work, he could make it work

Even the error was reproduced well

(Laughter) "Dr. Barrichelli claims the machine is wrong and the code is correct."

That's how he designed and moved the world.

The computer could be used after the bomb developers left

I had this machine running all night long, and you may know Stephen Wolfram, but he's the one who reinvented it.

Barrichelli made his research open and public

left as a document

"If life is easy to create, why not make some?"

And so he decided to give it a try and dabbled in artificial life science living in machines.

And he found out... like a naturalist, he looked into this little 5,000-byte world, and there he saw all the same things happening in the outside world of life.

These are the worlds he created

But it's just a number, not an organism.

i needed something

If you have a genotype, you must also have a phenotype

You need to go out and do something, and he started giving these little numerical creatures things to play with, like playing chess with other machines.

And artificial life began to evolve

After that he traveled around the world

I found a new, faster machine and ran it, and I saw what it is now.

It's a program that keeps running. Instead of turning it off when it's done, it keeps running. Like Windows, it runs everything as a multicellular organism that spans many machines, and we've seen everything happen.

And I saw evolution itself as an intellectual process.

Instead of being a creative intelligence, I thought of it as a massively parallel computing process with some kind of intelligence in itself.

He didn't say it was like life or a new kind of life.

I said it's just the same thing happening in a different way.

There's no real difference between what he did with computers and what nature did billions of years ago.

What if we did it again now?

One day, when I went to the archives to look into this, the person in charge of the archives came and said, "There was a box that had been left unattended. Would you like to see it?"

It was his world recorded on punch cards

It was left there for 50 years, as if hibernating.

It's an execution instruction... it's the source code for his world, and it's got an engineer's note inside that says something's wrong.

"There's something in this code that you didn't explain"

I think it's true, and we still don't understand how this simple instruction can create such a high degree of complexity.

Where is the line between life-like and life-like?

This card was saved by my chance encounter.

My question is, should I do this?

Should I run it?

Should it be published on the Internet?

What those machines think... This life form that died and was in heaven now comes back to life and sees the world...

My laptop world is 10 billion times bigger than it was when Barrichelli left the project.

He was far ahead of his time in thinking about nurturing a new kind of life.

And this is what is happening now!

Juan Enriquez told me that proteomics laboratories exchange 12 trillion bits of genomic data.

We've been doing that since we started doing PCR and synthesizing small pieces of DNA.

Pretty soon you'll actually be synthesizing proteins, and as Steve has shown, this opens up a whole new world.

It's the world von Neumann envisioned

Here's an incomplete paper on self-replicating machines, published after his death, discussing what it takes for a machine to start replicating itself.

It took three people to do this. Von Neumann, who showed how to build a Barricelli machine with code as a living thing. According to the latest tallies, four million Von Neumann machines are now being built every day. Julian Bigelow died ten days ago.

Inside every modern computer is a replica of the architecture that he once set out to design with pencil and paper.

The benefits are immeasurable

He describes the generosity of the various people who worked on this project at the Institute for Advanced Study in the '40s, who released their work to the world without patents, restrictions, or intellectual property arguments.

This is the last page of the journal, in July of 1958, when the machine stopped working.

This is the record when Julian Bigelow officially shuts down the car after running it until midnight.

That's it

thank you

(applause)

(Hindi) Hello

I'm a movie star and I'm 51. I haven't had Botox yet.

(Laughter) I don't do drugs, but you know, I act like a 21-year-old kid in movies.

That's right

I sell dreams and love to millions of people in my home country of India, and they think I'm the best lover in the world.

(Laughter) If you don't tell anyone, I'll confide in you that you're not, but I'm going to leave the delusions alone.

(Laughter) Many of you were warned that you hadn't seen my film, poor fellow.

(Laughter) (Applause) But that doesn't change the fact that I'm a movie star and I'm utterly self-assured.

(Laughter) My friends Chris and Juliet invited me to talk to them about "Future You."

Of course I'm talking about who I am now.

(Laughter) Because I think humans are very similar to me.

(Laughter) yeah yeah

Humanity is an aging movie star, grappling with all the new things around us, wondering if we really knew it in the first place, trying to find a way to still shine.

I was born in a refugee settlement in New Delhi, the capital of India.

My father was a warrior who fought for Indian independence.

Mother was a "warrior" called "mother"

And like our homo sapiens ancestors, we struggled to survive.

By my early twenties, I had lost both of my parents. Losing them sounds a little careless, but -- (Laughter) I remember the night my father died, and my neighborhood driver who drove me to the hospital.

He whispered, "Dead men don't boast chips," and disappeared into the darkness.

I was only 14 years old at the time, and I put my father's body in the back seat of the car, my mother next to me, and I started driving home from the hospital.

My mother, who was crying quietly, looked at me and said, "When did you learn to drive?"

After he said that, I realized, and replied, "It's right now, Mom."

(Laughter) From that night, I learned how to survive as rough as adolescent humans.

The frame of my life back then was honestly pretty simple.

I just ate what I got and did whatever I was told.

I thought "celiac" was a vegetable, and "vegan" was, of course, the name of Mr. Spock's lost companion on Star Trek.

(Laughter) If I could marry my first woman and fix a car carburetor, she would call me an engineer.

I thought "gay" was a fancy word for "happiness" in English.

"Lesbian" is, of course, the capital of Portugal.

(laughs) What were we talking about?

We depended on systems that previous generations had worked hard and sacrificed to protect us, and we felt that our government was actually working for us.

The science is simple and logical, and the apple was still just a fruit back then, first Eve, then Newton, and it wasn't Steve Jobs' yet.

And "Eureka!" was what I would shout when I wanted to run naked down the street.

I would go anywhere for work, and I was usually welcomed.

The word migration was still for Siberian cranes, not for humans.

Most importantly, I was myself and I was speaking my mind.

In my late twenties, I moved to the sprawling metropolis of Mumbai, and my framework began to change, like a newly industrialized, motivated human being.

In the busyness of the city, I learned a new and decorated way of surviving, and the way I see things has changed a little bit.

I met people from all over the world, faces, races, genders, moneylenders.

Definitions of things became more fluid.

Around that time, work began to define us, under the pressure of overwhelming equalization, and we began to feel that the system was unreliable. It was too slow to keep up with the diversity of humanity.

Ideas flowed more freely and faster.

I've experienced the miracle of human innovation and collaboration, and the miracle of my own creativity, fueled by the hard work and resourcefulness of everyone around me, propelling me to stardom.

I felt that my time had come, and by the time I was 40, I was generally successful.

I was everywhere

Until then, he appeared in 50 movies, sang 200 songs, and was awarded the title of knight from Malaysia.

I was awarded the highest citizenship honor by the French government, whose name I still can't pronounce.

(Laughter) Excuse me. Thank you France for your kindness.

But what was even more amazing was meeting Angelina Jolie (Laughter) for about 2.5 seconds.

(Laughter) I'm sure she remembers my encounter.

well i don't remember

Then I sat next to Hannah Montana at the round table, though she had her back to me most of the time.

I was on the fast track From Miley to Jolie Humanity was soaring with me

we were both flying almost out of control

and as you all know

the internet appeared

In my late 40s, I started tweeting like a canary in a birdcage, thinking it was a miracle that I thought would be admired by people who took a peek into my world.

But something else was waiting

We expected ideas and dreams to flourish in a more connected world.

I didn't expect this, that the sparse, narrow thinking, the criticism, the labeling, flowing out of the same place where freedom and revolution happen.

All my statements have been given another meaning

The world commented and criticized everything I did, good, bad, ugly.

In fact, things I didn't say or do were criticized as well.

Four years ago, my beautiful wife Gourry and I decided to have our third child.

A rumor circulated online that the child was the illegitimate child of his eldest son, who was 15 years old at the time.

Legend has it that he sowed the seeds of love with a girl while driving in Romania.

And even fake video footage was created.

our family was really confused

My now 19-year-old son still turns his back on me when I see him and says, "I didn't even have a European driver's license."

(laughs) yeah

Slowly, in this new world, reality became virtual, virtual became real, and I began to feel that I could not be myself or say what I thought, and at this point humanity was exactly like me.

I think we both had midlife crises, and humanity became, like me, an overexposed prima donna.

I became the face of everything from hair oil to diesel generators.

Humanity was buying and selling everything, from crude oil to nuclear reactors.

I also tried to put on a tight hero suit in order to be reborn.

So I admit I failed miserably

But let me tell you, on behalf of all the Batmans and Spider-Mans and Supermans of the world -- they should be honored because their groins really hurt when they wear hero suits.

(Laughter) It's an honest feeling.

And by chance I invented a new dance

Without realizing it, it became a big boom.

So if you don't mind, as you can see, I'm not the type to be shy

lungi dance

If you don't mind, let me show you now. I'm pretty good at it.

(cheers) It's like this

lungi dance lungi dance lungi dance lungi dance

lungi dance lungi dance lungi dance lungi dance

lungi dance lungi dance lungi dance lungi

This is how it became a big boom

(cheers) It's true.

No one knew what was going on except me, and I didn't care, because the whole world and the whole human race seemed as confused and disoriented as I was.

but i didn't give up

I even tried to reshape my image on social media like everyone else.

I thought that if I tweeted philosophically, people would think I was intelligent, but the response to those tweets was a gibberish abbreviation.

ROFL or LOL (meaning "lol")

Someone commented "ADIDAS" on my thought-provoking tweet What do I mean? I wondered what happened to the sneaker brand name?

When I asked my 16-year-old daughter, she told me

ADIDAS stands for "Dreaming of sex all day"

(Laughter) It's true.

Did you know?

So I replied to Mr. Adidas in bold, "WTF," while appreciating that some abbreviations still mean the same thing.

WTF

but we are here

As I said earlier, I'm 51 years old, and despite the boring, boring abbreviations, I want to tell you that if there ever was a critical moment in human existence, it's now.

Humanity today has hope

Today's humanity is innovative, resourceful, and of course, it's frustratingly vague.

And in this magical, enchanting, incomplete moment of existence, I felt a little courage just before I came here, and decided to take a closer look at my face.

And gradually I realized that I looked more like my wax figure at Madame Tussauds.

(Laughter) In that moment, I asked the most pressing question for humanity and for me: Should I have plastic surgery?

Seriously, because I'm an actor, it's a modern expression of human creativity.

The country I came from is a source of a mysterious but very simple spirituality.

With its immense generosity, India decided that the son of a poor Muslim freedom fighter who stumbled into the business of selling his dreams should become the King of Romance, the Emperor of Bollywood, and India's all-time sweetheart.

with this face

yes

(Laughter) I've been described as ugly, I've been described as having a different coat, and strangely, I've been described as lacking chocolate.

(Laughter) The people of this ancient land embraced me with their boundless love, and I learned from them that power and poverty don't make life better or easier.

I have learned from the people of my country that the dignity of life, the dignity of a human being, a culture, a religion, a nation lies in its grace and its ability to care.

I've learned that whatever moves us, what inspires us to create and build, what saves us from failure, and what helps us survive, is perhaps the oldest and most primal emotion known to mankind: love.

There is a famous poem by my country's mystical poet (Hindi poem) (Reading done) This roughly translates to anything -- if you know Hindi, please clap.

(Applause) It's very hard to recite this.

It roughly translates to "Read the books of all knowledge, impart your knowledge through innovation, through creation, through technology, but humanity will never be wise about its future unless accompanied by a sense of love and compassion for one's fellowmen."

This two-and-a-half-letter word, प्रेम (prem), means love, and if we can understand it and put it into practice, that's enough to enlighten humanity.

That's why I believe that the "future you" should be someone you can love.

otherwise prosperity ceases

become selfish and perish

You can use your power to build walls and keep people out, but you can also use it to break down barriers and welcome people in.

You can use your faith to frighten people into submission, or you can empower them and help them ascend to the heights of enlightenment.

You can use that energy to create a nuclear bomb, to spread the darkness of destruction, or to spread the light of joy to millions of people.

You can ruthlessly pollute the oceans and cut down forests.

You can destroy the environment, or you can turn to nature with love and regenerate life from water and trees.

We might go to Mars and build an armed fortress, or we might look for life forms and species, learn from them, and respect them.

We can spend all the money we earn and wage futile wars and put guns in the hands of little children to kill each other, or we can use the same money to produce more food and feed the hunger of the people.

My country has taught me that the human capacity to love is like devotion.

It shines brightly in a world where civilization has tampered with

Over the past few days, amazing people have come together to showcase their talents, talk about what they've accomplished, about innovation, about technology, about science, about knowledge, and we've learned it here, and TED Talks and you guys are a good reason to celebrate "The Future of Us."

But within its blessings the quest to cultivate the capacity for love and compassion must assert its existence just as strongly.

That's why I believe that the "future you" is the "immortal you"

It's like a circle called a chakra in India.

Starts from where it ends and completes itself

It's you who perceives time and space separately, and understands both the incredible significance of your existence and the utter insignificance in the larger context of the universe.

It is you who return to the original pure humanity, who loves with a pure heart, who sees through the eyes of truth, and who dreams with the same clarity of mind.

Your future self should be like an aging movie star, a movie star who's completely narcissistic and has believed in the possibility that there's a world in love with itself.

It's up to you to create a world where the world is its own best lover

I believe that's what "future you" should be.

thank you very much

(Hindi) Thank you

(Applause) Thank you.

(Applause) Thank you.

(applause)

This is Lee Sedol

Lee Se-dol is one of the best Go players in the world, but he's having a moment when his friends in Silicon Valley say, "Oh my god."

Humans lost to machines on the Go board, but what about in the real world?

The real world is much bigger and much more complex than the Go board.

It's much less predictable, but it's still a decision problem.

If you think about the technology that is coming —

Noriko Arai mentioned that machines aren't yet ready to really understand and read.

It will eventually be able to do that, and when it does, machines will quickly read through everything that humans have ever written.

In that case, machines will be able to make better decisions than humans in the real world by being able to touch more information, combined with the ability to see farther than humans shown in Go.

Is that a good thing?

I hope so

Our civilization itself, everything we value, rests on our intelligence.

When we have far more intelligence at our disposal, there will be no limit to what humans can do.

As some people say, this could be the greatest event in human history.

So why is it said that AI could mean the end of humanity?

Is this new?

Is it just Elon Musk and Bill Gates and Hawking saying it?

No. This idea has been around for quite some time.

Here's what someone said, "Even if we can keep machines in a subordinate position by things like switching off at critical moments — we'll come back to this 'switching off' thing later — we as a species should be humble."

Whose words? That's what Alan Turing said in 1951.

As you know, Turing is the father of computer science and in many ways the father of AI.

If you think about this problem, which is the problem of producing something more intelligent than your own species, you might call it the gorilla problem, because millions of years ago, gorilla ancestors did it, and you can ask the gorillas, "Would that have been a good idea?"

The gorillas meet to discuss whether it was a good idea, and after a while they come to the conclusion that it was a bad idea.

Our species is in dire straits because of it.

You can see the existential sadness in their eyes.

(Laughter) There's this uneasy feeling, "Isn't it a good idea to create something more intelligent than our own species?" And what can we do about it?

I may have no choice but to stop developing AI, but I don't have that option because of all the benefits that AI brings and because I'm an AI researcher myself.

In fact, I would like to continue with AI.

I need to clarify this issue a little more.

what exactly is the problem?

Why could good AI lead to our destruction?

And here's another quote: "The purpose you give a machine has to be something you're sure you really want."

This is what Norbert Wiener said in 1960, shortly after he saw that the earliest learning systems pointed checkers better than their creators.

But it wouldn't be strange if these were the words of King Midas.

King Midas wished that everything he touched would turn to gold, and his wish was fulfilled.

This was, so to speak, the purpose he gave the machines, and all his food and drink and relatives turned to gold, and he died of grief and hunger.

So let's call it the "King Midas problem" to set goals that don't align with what you really want.

In modern parlance, this is called the "value alignment problem."

Giving it the wrong purpose isn't the whole problem.

there is another side

If you give a machine a very simple purpose, like "get me a coffee," it thinks, "What are the possible situations where it fails to fetch a coffee?"

someone might turn off their switch

If we don't take action to prevent such things from happening

Disable your "off" switch

I'll do whatever it takes to protect myself from anything that prevents me from accomplishing my given purpose."

The problem we face is that a very defensive and single-minded pursuit of one purpose is not in line with the true purpose of humanity.

In fact, that's the valuable lesson we can learn from this talk.

If there's one thing to remember, it's that if you die, you can't get your coffee.

(Laughter) It's easy. Memorize it and chant it three times a day.

(Laughter) Actually, that's the plot of 2001: A Space Odyssey.

HAL, fortunately, was very smart, but not superintelligent.

So in the end, the main character was able to outsmart and turn off the switch.

But we may not be so lucky

So what should we do?

I'm going to try to redefine AI, moving away from the classical view of "a machine that intelligently pursues its goals."

there are three principles

The first is the principle of altruism, where the sole purpose of robots is to maximize the realization of human goals, human values.

The value I'm talking about here isn't some kind of noble value.

It's simply whatever humans want out of their lives.

This principle goes against Asimov's principle that robots must protect themselves.

They have no interest in maintaining their own existence.

The second principle is what I would call the principle of humility.

This turns out to be very important in making robots safe.

This principle assumes that robots don't know what human values ​​are, that robots don't know what they should maximize.

This avoids the problem of single-minded pursuit.

This uncertainty is extremely important.

To be useful to humans, we need a rough understanding of what we want.

Robots get that information primarily by observing human choices, and the choices we make reveal information about what we want out of our lives.

These are the three principles

Let's see how this applies to Turing's question, "Can I turn off the machine?"

This is a PR2 robot

The one in our lab has a big red "off" switch on the back.

The question is, will the robot let me switch off?

If we were to do it the old-fashioned way, we would say, "Get me coffee," and you would say, "I have to get you coffee." "If you die, you won't get me coffee." PR2, who was listening to my talk, decided, "I have to disable the off switch."

(Laughter) This seems inevitable.

Failure modes like this seem inevitable, and that's because they have a concrete, absolute purpose.

What if the machine wasn't sure what the purpose was?

should infer differently

"Humans may switch themselves off, but only when they do something wrong.

I don't know what bad things are, but I don't want to do bad things."

The first and second principles come into play here.

"That's why humans should be allowed to switch off."

In fact, we can calculate the incentive for the robot to allow the human to switch off, and it's directly tied to the degree of uncertainty of the objective.

When the machine is switched off, the third principle comes into play

You learn something about the purpose you should pursue; you learn from your own wrongdoings.

As mathematicians often do, we can use Greek letters to prove the theorem that such robots would be beneficial to humans.

It's provable that machines designed that way perform better than those that aren't.

This is a simple example, but it's the first step towards having human-compatible AI.

I think you're all confused about the third principle.

"My actions are not what I look up to

I don't want robots to behave like me.

Sneaking into the kitchen in the middle of the night and taking food out of the fridge

Because you do things like that and things like that."

There are many things I don't want robots to do.

But it doesn't really work that way.

It's not like if you behave badly, the robot will imitate you.

It may even help you understand what motivates people to do so and resist temptation.

it's still hard

What we're trying to do is have a machine predict every person in every situation. Which do they prefer?

There's a lot of difficulty with this, and I don't think it's going to be resolved very quickly.

The real hard part is on us

Like I said, we behave badly.

Some people are even vicious

But robots don't have to imitate human behavior.

A robot doesn't have a purpose of its own

purely altruistic

And it's designed to respect everyone's tastes, rather than just trying to satisfy one person's desires.

So to a certain extent, I can handle bad things, and I can understand the bad sides of people, like immigration officers taking bribes so they can feed their families and send their kids to school.

Robots can understand that, but they don't steal for it.

I just help my kids get to school.

Humans are also limited in terms of computing power.

Lee Sedol is a great Go player, but he still lost.

If you look at his actions, you'll see that he made a move that would have resulted in him losing the game.

But that doesn't mean he wanted to lose.

To understand his behavior, we have to go backwards through a model of human cognition, and it's a very complex model that includes the limits of our computational power.

But it's something we can work to understand.

The hardest part from my point of view as an AI researcher is that there are many of us humans, so machines have to make trade-offs and weigh many different human preferences, and there are many ways to do that.

Economists, sociologists, ethicists know this, and we're looking for ways to work together.

Let's see what happens if we don't do it right

For example, consider this conversation: An intelligent secretary AI may become available in the next few years.

It's like enhanced Siri

Siri says, "My wife called me to confirm tonight's dinner."

Of course you forget "What kind of dinner?

what are you talking about ”

"It's the 20th anniversary dinner at 7pm."

"I can't, I have to meet the secretary general at 7:30.

How did this happen? ”

"I warned you, but you ignored my recommendation."

"What should I do? I can't say I'm too busy to go."

"Don't worry, I've arranged for the Secretary-General's flight to be delayed."

(Laughter) "I tampered with the computer."

(Laughter) "Eh, can you do that?"

"I am very sorry to hear that and look forward to seeing you at lunch tomorrow."

(Laughter) There's a bit of a misunderstanding about value here.

Siri clearly follows the wife's values: "The wife's happiness is the husband's happiness."

(Laughter) It could go the other way.

You get home from a busy day at work, and your computer says, "Looks like you had a rough day."

"I didn't even have time to eat lunch."

"You must be hungry."

"Oh I'm hungry Can you make me something for dinner?"

"There is something I need to talk to you about."

(Laughter) "There are people in South Sudan who are more in need than you."

(laughs) "I decided to go, so please make your own dinner."

(Laughter) We have to solve these problems, and I'm looking forward to working on those problems.

There's reason to be optimistic

One is that there is a huge amount of data

Remember, machines will read everything humans write.

Most of what humans write is that someone did something and other people got upset about it.

There is a lot of data to learn from

And there are strong economic incentives to do this right.

Imagine having a household robot in your home.

You come home late from work again, and the robot has to feed the children.The children are hungry, but the refrigerator is empty.

So the robot looks at the cat

(Laughter) Robots haven't properly learned human values, so they don't understand that the emotional value of cats outweighs the nutritional value of cats.

(Laughter) What then? "Crazy Robot Cooks a Kitten for Dinner"

You'll see headlines like

One event like this is the end of the domestic robot industry.

So there's a huge incentive to get this problem right long before we get to superintelligent machines.

So in summary, I'm trying to redefine AI so that we have machines that are provably good for humans.

The principle is that machines are altruistic and seek only human goals, but are unsure of what those goals are, and by observing all humans they learn what it is that we really want.

I hope that in the process, humanity will learn how to be better.

thank you

(Applause) (Chris Anderson) Very interesting, Stewart.

I'm ready for the next speaker, so let's talk a little bit here.

i have a question

The idea of ​​"programming ignorance" seems very powerful.

How can we prevent a superintelligent robot from reading literature, realizing that knowledge is better than ignorance, and rewriting its programs to change its purpose?

(Stuart Russell) We want robots to learn human purpose well.

The more accurate the robot, the more confident it becomes, because the clue is there, and it's designed to interpret it correctly.

For example, they will understand that there is bias in the content of books.

It's all about what kings and princesses and elite white men did.

So it's a complicated problem, but the more robots learn about our purpose, the more useful it will be for us.

(Chris) Can't you just stick to one principle? As a fixed program, something like "If a human tries to turn off the switch, it will obey unconditionally"

(Stewart) That's no good.

it's a bad idea

Think about taking a five-year-old to kindergarten in a self-driving car.

Do you want a 5-year-old who is alone in the car to be able to switch off the car?

No, the robot needs to understand how rational and sensible the human is.

The more rational people are, the more likely they are to switch off.

I don't think it would be very easy to get a completely random person or someone with bad intentions to turn it off.

CA: Stewart, I really hope that you can solve this problem for everyone.

thank you very much it was a great story

(Stewart) Thank you very much. (Applause)

Have you ever wondered how important the ocean is to our daily lives?

The ocean occupies two thirds of the earth's surface area

provides half of the oxygen we breathe

stabilize the climate

It provides us with jobs, medicines and food that contains 20 percent of the protein that the world needs.

It was once thought that the ocean was so vast that it was impervious to human activity.

Today I'm going to talk to you about a dire situation that is changing the ocean, and it's called "ocean acidification" or "climate change's evil twin."

Did you know that the oceans absorb 25% of the carbon dioxide we put into the atmosphere?

Carbon dioxide is a greenhouse gas that's contributing to climate change, so this is another great benefit of the ocean. This is another great benefit of the ocean.

But as we continue to put more and more carbon dioxide into the atmosphere, but as we continue to put more and more carbon dioxide into the atmosphere, carbon dioxide continues to melt into the oceans.

That's what's changing the ocean's chemical system.

When carbon dioxide dissolves in seawater, many chemical reactions take place.

Lucky for you, we don't have time today to go into detail about chemistry.

But as more carbon dioxide dissolves into the ocean, the pH of the ocean water drops.

That basically means that ocean acidity will increase.

This whole process is called ocean acidification

Ocean acidification is co-occurring with climate change.

Scientists have been observing ocean acidification for over 20 years.

Here's an important time series from Hawaii. The top line shows the ever-rising atmospheric carbon dioxide concentration. The top line shows the ever-rising atmospheric carbon dioxide concentration.

This is proportional to the result of human activity

The line below it shows that the concentration of dissolved carbon dioxide in the surface layer of the ocean is rising, at the same rate as atmospheric carbon dioxide since observations began.

The bottom line shows changes in chemical composition.

As more carbon dioxide dissolves into the ocean, the pH of the ocean drops, which basically means that ocean acidity is increasing.

In Ireland, scientists are monitoring ocean acidification -- scientists from the Institute of Oceanography and the National University of Ireland, Galway.

We're also observing the evolution of ocean acidification, and it's progressing at the same rate as the oceanic data around the world.

this is happening right next to us

Let me give you an example of how we collect data to monitor changes in the ocean.

First, we collect a lot of samples in the middle of winter.

And as you can imagine, the North Atlantic can get really stormy, and it's not for people who get seasick, and we're collecting very valuable data.

We take the machine off the boat, and there are sensors on the bottom of the machine that tell us what's going on with the seawater around us -- temperature, dissolved oxygen, things like that.

Then we collect seawater samples in these big bottles.

The seafloor near the continental shelf is rough to a depth of 4km or more, but the seafloor near the continental shelf is rough to a depth of 4km or more.

Seawater is pulled up on deck and either analyzed on board or brought back to the laboratory for analysis of various chemical parameters.

Why is this important?

How will ocean acidification affect humans?

Facts like this are a concern

Ocean acidity is already 26 percent higher than in the pre-industrial era, directly due to human activity.

Ocean acidity is projected to rise by 170% by the end of the century, unless carbon emissions are slowed.

while our children are alive

Current ocean acidification is 10 times faster than anything in the last 55 million years or more.

Marine life has never experienced such rapid change.

We literally can't predict how marine life will adapt.

Natural ocean acidification occurred millions of years ago, but it was much slower than it is today.

At the same time, many marine organisms went extinct in large numbers.

Will it happen again?

maybe

Studies have shown that some species respond well, but many species respond poorly.

One of the major concerns is that as ocean acidity increases, the concentration of carbonate ions in seawater decreases.

These ions are fundamentally important components of many shell-building marine organisms, such as crabs, mussels, and oysters.

Another example is coral

Corals use carbonate ions in seawater to build their skeletons to form coral reefs.

As ocean acidity increases, the concentration of carbonate ions decreases, making it difficult for these species to shell at first.

At even lower concentrations, it actually starts to dissolve.

This is a pteropod, also called a sea butterfly.

It's an important food source for many species in the ocean, from krill to salmon to whales.

In an experiment in which pteropod shells were immersed in seawater with a pH predicted for the end of this century,

We can see that after just 45 days in seawater with this very realistic pH, the shells are almost completely dissolved.

Ocean acidification therefore directly affects the food chain and our daily diet.

You like shellfish and salmon, right?

Many other fish eating food that could be affected Many other fish eating food that could be affected

this is cold water coral

Did you know that there are cold-water corals right next to the shelf in the Irish Sea?

Cold-water corals support rich biodiversity, including important marine resources

It is estimated that by the end of this century, 70% of the world's known cold-water corals will be surrounded by skeleton-dissolving seawater.

And finally, my example is healthy tropical coral.

When immersed in seawater with the expected pH in 2100,

After six months, the coral had almost completely dissolved.

Coral reefs support 25% of all marine life in the world

all marine life

So we can see that ocean acidification is a global threat.

I have a son who is eight months old

Unless we delay ocean acidification now, it's scary to think about what the ocean will look like when my son grows up.

Ocean acidification is inevitable

Humans have already released too much carbon dioxide into the atmosphere.

but you can delay

Prevent worst-case scenarios

The only way to prevent it is to reduce carbon dioxide emissions.

This is important for you, private industry and government.

We need to work together so we can both slow global warming and ocean acidification and maintain a healthy ocean and planet for our generation and generations to come.

(applause)

It's six o'clock in the morning and it's dark outside the house.

My 14-year-old son is sleeping soundly in his bed.

I flick the light switch on and sway my poor child up because like a band-aid, the sooner it's done the better.

(Laughter) I have a friend who yells, "Fire," to wake up a sleeping teenager.

Another friend was so impatient that she had no choice but to pour cold water on her son's head and kick him out of bed.

Sounds like a bad deal

Sound familiar?

Every morning I ask myself, "How can I do this to my son when I have the knowledge and the work to do?"

Actually, I'm a sleep researcher.

(Laughter) I know all too well about sleep and the ill effects of sleep deprivation.

As a growing teen, I admit I'm depriving my son of the sleep he so desperately needs.

I know — by waking my son hours before his natural body clock tells him it's time to wake up, I'm literally robbing him of his dreams — the type of sleep most associated with learning, memory consolidation, and emotional processing.

My kids aren't the only ones who suffer from sleep deprivation.

Sleep deprivation is epidemic among American teenagers.

Only 1 in 10 people get the eight to 10 hours of sleep recommended by sleepologists and pediatricians.

If you're patting your chest saying, "Good, my baby has been sleeping for eight hours," remember, eight hours is the minimum recommended time.

It's just barely filling

8 hours of sleep is barely passing

Many factors contribute to the sleep deprivation epidemic, but the number one reason teens are not getting the hours of sleep they need is actually social policies.

It's not adolescent hormones or social life or Snapchat.

In the United States, many schools start at or before 7:30 a.m., even though major medical institutions recommend 8:30 a.m. or later as the start time for middle and high school education.

Early school start times are having a direct impact on the amount of sleep — or rather, lack of sleep — among American teenagers.

And because of this, children and their parents are fighting a fundamentally unwinnable battle with their bodies.

In pre- and post-pubertal teenagers, the biological clocks that determine when we're most awake and when we're most sleepy are delayed.

This is partly due to the delayed release of the hormone melatonin.

A teenager's body doesn't produce melatonin until about 11 p.m., which is two hours later than adults and younger children.

By the biological clock, waking a teenager at 6 a.m. is the same as waking an adult at 4 a.m.

On those unlucky days when I have to wake up at 4 a.m., I'm a zombie too.

can't function properly

You can't think straight, you're frustrated, you probably shouldn't be driving the car.

But this is what American teens feel every day of school.

In fact, many of the unpleasant traits we attribute to teenagers — moodiness, irritability, lack of motivation and depression — could also be the result of chronic sleep deprivation.

For many teens who struggle with chronic sleep deprivation, the go-to remedy is heavy caffeine intake — Ventisize Frappuccinos, energy drinks and tonics.

So the corollary is that almost all young people are tired and on edge.

As proponents of the sleep-first start time understand that adolescence is a time of dramatic brain development, it's especially the parts responsible for higher-level thought processes, including reasoning, problem-solving, and good judgment, that thrive.

In other words, it's the hallmark of puberty, the part of the brain that controls the impulsive and often dangerous behaviors that can be terrifying to parents of teens.

Teenagers, like everyone else, suffer short-term and long-term consequences for their brains, bodies, and behaviors if they don't get the sleep they need.

You can't concentrate, your attention plummets, and you develop ADHD-like behavioral symptoms.

The effects of teenage sleep deprivation go well beyond school, and worse, it leads to a spike in mental health problems in adolescence, including drug use, depression and suicide.

In our study of teenagers in the Los Angeles Unified School District, we found that teenagers with sleep disorders were 55 percent more likely to have consumed alcohol in the past month.

Another study of more than 30,000 high school students found that every hour of sleep lost was associated with a 38 percent increase in feelings of sadness and hopelessness and a 58 percent increase in suicide attempts.

Not only that, sleep-deprived teens are at greater risk of physical health problems like obesity, heart disease and diabetes that plague our nation.

And there's also the risk of sleep-deprived teens getting behind the wheel shortly after getting their driver's licenses.

Studies show that getting five hours or less of sleep is just as dangerous as driving with a blood alcohol level above the legal limit.

Sleep-first start time proponents and researchers in the field have come up with an amazing scientific observation that delaying the start time can yield huge benefits.

The results are clear, and as a sleep researcher, I couldn't be more certain.

Teens in regions with late start times get more sleep

A naysayer might say that a later start time just means more nights, but the truth is just the opposite: you stay at bedtime, wake up later, and sleep longer.

School attendance has increased, and absenteeism has decreased by 25 percent in one school district.

Less likely to drop out

Of course, you'll also get better grades.

This can be expected to reduce the academic achievement gap in the true sense of the word.

Increases performance in math and reading comprehension on standardized tests by 2-3%

This is as effective as reducing the number of students in a class by a third, or replacing a decent teacher with a really good teacher from the field.

Better physical and mental health and a happier family

Who can complain when teenagers become nicer and less grumpy?

Declining car accident rates also lead to a safer social environment, with one school district reducing accident rates by 70 percent.

With such a huge advantage, you might think there's no need to argue, right?

So why has our society failed to heed this call?

The arguments against late start times often go something like this: "Why delay start times for them?

We should cut it in and prepare it to go out into the real world."

But that's the equivalent of saying to a parent of a two-year-old, "Don't let Johnny take naps because it's not going to prepare him for kindergarten."

(Laughter) Delaying school time creates a lot of problems with pick-up and drop-off.

This is a problem not only for students and their families, but for society as a whole.

Review of bus routes Increase in transportation costs Impact on sports activities and measures to deal with before school starts and after school

Every time school starts are discussed, every school district across the country inevitably brings up issues like this over and over again.

It's a legitimate concern, but it's a problem that needs to be addressed.

You can't use these assignments as an excuse to do what's good for your kids, that is, not start middle and high school before 8:30 a.m.

In school districts large and small across the country that started after 8:30, the initial concerns were not found, and the benefits to student health and performance and the safety of society as a whole outweighed them tremendously.

Tomorrow morning, when it's wintertime and the clocks are an hour slower, and you're getting an extra hour of good sleep, and the days are feeling a little longer, and you're feeling a little more hopeful, think about the wonderful power of sleep.

Think about the benefits of allowing children to wake up naturally, in tune with their biological clocks.

Wishing you all a wonderful dream, thank you

I have a two-year-old daughter named Naya, and she thinks this conference is named in honor of her dad.

(laughs) You can't go against your beloved daughter, can you?

Parenthood, as many of you have experienced, can turn your attention to long-term issues like climate change.

Inspired by the birth of my daughter, I created the Climate Action Organization, hoping to find a conservative way forward on this overly divisive issue in America.

Yes, Republicans have a plan for climate change, and

it may be much better

(Laughter) Let me prove it.

What we need is a 'better app' for climate policy.

In the world of technology, great applications are transformative and even create their own markets, like Uber.

The climate world's powerful apps are new and promising solutions that break through seemingly insurmountable barriers to progress.

Barriers to progress include psychological ones

Climate activists have long persuaded their own citizens to make short-term sacrifices for benefits that will be available to people in other countries 30 or 40 years from now.

It didn't work because it goes against basic human nature.

Geopolitical barriers are next

Current emissions trading rules give countries a strong incentive to ride on other countries' reductions for free, instead of strengthening their own emissions reduction programs.

This has been a thorn in any international climate change negotiation, including the Paris Agreement.

Finally, there is the partisan barrier.

Given that even the most committed emissions reduction participants, such as Germany, the United Kingdom and Canada, are reducing their emissions at the scale and speed required

remains far from

And here in the United States, partisan stances on climate issues are much more acute.

We're basically stuck. To break through each barrier, we need a powerful climate app.

I believe that the path to climate change in the United States is connected through the Republican Party and the business community.

In setting up the Climate Leadership Council, I started by meeting some of the most celebrated Republican political veterans and business leaders: James Baker and George Schultz, America's most respected Republicans, Martin Feldstein and Gregory Mankiw, the most respected conservative economists, and Henry Paulson and Rob Walton, the most successful and admired business leaders.

We wrote this together, "The Conservative Scenario for the Carbon Tax Dividend."

This is the first concrete market-based climate solution from Republican leaders.

(Applause) Thank you.

(Applause) We announced this plan at the White House two weeks after President Trump took office.

Almost every major media editorial board in the country has endorsed our plan, and Fortune 100 companies from a wide range of industries are on board.

You're probably thinking, what the hell is that plan?

The carbon tax dividend policy is based on four pillars

The first is the gradually increasing carbon tax.

Capitalism is a great system, but like an operating system, it's prone to bugs, and it's called "market failure."

The biggest flaw is that market prices do not inherently factor in social and environmental costs.

In other words, all market transactions are based on misinformation.

This capitalist bug is responsible for this climate problem more than any other factor.

In theory, this should be an easy problem to solve.

The best solution, as economists agree, is to tax the carbon content of fossil fuels, called a carbon tax.

This will reduce carbon emissions at each stage of everyday economic transactions.

But so far, the carbon tax itself has been an unpopular and political impasse.

The answer to this is to return all the money raised directly to the public in the form of monthly dividends.

This would turn the unpopular carbon tax into a popular populist solution, breaking down underlying psychological barriers to the public by making real, immediate and tangible benefits for everyone.

The benefits that come from this are huge

Assuming a carbon tax rate starting at $40 per tonne, in the first year a family of four would receive $2,000 a year.

According to the U.S. Treasury Department, the bottom 70% of Americans will receive more in dividends than they would have to pay due to rising energy prices.

Solve climate change and give 223 million Americans an economic win

This is -- (applause) revolutionary and could fundamentally change the politics of climate change.

But there is another revolutionary element

As the carbon tax rate goes up, so does the dividend.

The more we try to stop climate change, the more benefits our citizens will get.

This creates a positive auto-reduction loop, which is very important, because only in a scenario where the carbon tax rate increases every year can we reach our long-term emission reduction targets.

The third pillar of our program is the elimination of regulations that are no longer necessary after the carbon tax dividend plan is enacted.

This is a key selling point for Republicans and business leaders.

So why deregulate climate change for a carbon price?

let me explain

Our plan achieves emissions reductions that are almost double the amount of all Obama-era climate regulations combined, which is almost three times the new baseline after President Trump scrapped all of those regulations.

This assumes a carbon tax that starts at $40 per tonne, which roughly translates to 36 cents per gallon of oil.

Our plan alone will cover nearly all of the emissions reductions allotted to the United States under the Paris Agreement, and as you can see, the emissions reductions will continue.

This shows the power of conservative climate change policy based on free markets and small government.

We're going to have less regulation and, at the same time, far less air pollution, which will help working-class Americans move forward economically.

— Doesn't this sound like a plan we could all support?

(Applause) The fourth pillar of the program is a new climate domino effect based on border adjustments.

It may sound complicated, but it's also a revolutionary idea. A whole new strategy to reach a global carbon price, a global carbon price, which is exactly what we need.

Let me give you an example

Assume that country A has adopted a carbon tax dividend plan Country B has not

To balance the playing field, to protect industrial competitiveness, country A taxes imports from country B based on carbon content.

structure

This is where things get interesting.

Shouldn't the citizens of country B start demanding that the money should be returned to them and that they also implement a carbon tax dividend plan in their own country?

Add a few more countries and you have a new climate domino effect.

Once a major country or region adopts a carbon tax dividend system that includes border adjustments, others will follow.

Like dominoes falling one by one

And this domino effect can start anywhere.

My preference is, of course, the United States, but you can start in other countries, such as the United Kingdom, or Germany, or any other European country, or even China.

Take China for example

China is striving to cut greenhouse gas emissions, but the priority for its leaders is to shift the economy toward consumer-led economic development.

There is no better way to hasten that transition than by giving every Chinese citizen a monthly dividend.

That would be the only solution to get China to achieve both environmental and economic goals at the same time. That would be the only solution to get China to achieve both environmental and economic goals at the same time.

This is a powerful app for climate policy because it allows us to overcome each of the barriers I mentioned earlier: psychological barriers, partisan barriers, and geopolitical barriers.

We need national leadership

When you're looking for something, you use advertising, right?

let's read this together

Call for: Countries to Develop Carbon Tax Dividend Plans

National burden: Zero

Start Date: Immediately

The benefits are: Most effective climate action Popular populist Supports economic growth and business Small government Helps the working class

Additional rewards are gratitude from the present and future generations and also from my daughter.

thank you

(Applause) Chris Anderson: Let me ask you a question, Ted.

I don't think I've ever seen conservatives get this kind of applause at TED.

that's pretty great

There seems to be strong logic, but some of the politicians you talk to say it's going to be difficult to get this through Congress.

What do you think of the momentum of this idea?

Ted Halstead: I think people are very pessimistic about what's happening in America under Trump.

I'm not so pessimistic

This White House action, early action on climate change, is just the first move in a complex climate game.

So far, it's been a do-it-yourself strategy, but with increasing public pressure to choose alternatives, here's what we have to offer.

for three reasons

One, the business community fundamentally disagrees with the White House on climate change.

In fact, dozens of Fortune 100 companies endorse our program.

Within the next two months, we'll also be announcing the names of the unlikely companies that will be joining the program.

Second, there is no other challenge in American politics where the gap between Republican voters and Republican leaders is more fundamental.

Third, in the chess analogy, the next big move is: Will the administration remain in the Paris Agreement? is to say

Both scenarios should be considered

If, as many hope, the administration remains in the Paris Agreement, the question will continue to be, "So what's your plan?"

it has our plans

International pressure would be tremendous if we didn't remain in the Paris Agreement.

The U.S. Secretary of State would ask other nations to cooperate with NATO, and he would say, "We should stick to the Paris Agreement first.

If America keeps its promises, we will keep our promises.”

The international community, the business community, and even the Republican constituency will all push for the Republican alternative.

We hope that our suggestions will help

Chris: Thank you, Ted.

Ted: Hello Chris.

(applause)

see this work

What are you looking at?

At first glance, it looks like a large pendulum clock with a sheet over it and a rope tied in the middle.

But once you see it, you will definitely want to see it again.

then again

What do you see now?

If you look closely, you'll realize that the whole piece is one sculpture.

No pendulum clock, no rope, no sheets.

It's a single block of bleached Honduran mahogany.

But let me be clear here, this is not an exercise in appreciating sculpture.

It's an exercise in seeing, an exercise in understanding how looking closely can save a life, make a difference in a company, or help you understand why your child is doing what he or she is doing.

I call this skill "visual intelligence," and I teach it through art to a wide variety of people, including the general public and people who see for a living, like Navy SEALs, homicide detectives, and trauma nurses.

In fact, no matter how good you are at seeing, there's still a lot to learn about seeing and understanding.

We tend to think that we can understand things instantly at first glance, but the real skill comes from understanding how to look more carefully.

This ability begins with a reminder that those of us who are preoccupied with urgent errands every day can take a step back and look through a lens that reveals what we have missed before.

So why is it helpful to look at paintings and sculptures?

because art is a powerful tool

It requires both vision and insight, and is a powerful tool for reconstructing our position and understanding of what we see.

Here's one piece of art that reminds me of the fact that visual intelligence is something we're always learning, and we can never truly master.

I came across this quiet, seemingly abstract painting, and had to get up close and look at it a couple of times.

I've seen the Washington Monument with my own eyes a thousand times, and I'm well aware that the color of the marble changes in the bottom third, but I've never really taken this monument out and looked at it as a work of art.

This painting of a monument by Georgia O'Keeffe made me realize that concentration allows me to see things that I normally see from a whole new, eye-opening perspective.

But some skeptics believe that art should be in museums.

People who believe that art has no utility beyond its aesthetic value.

I know people like that when I teach them.

Her arms are crossed, her legs are crossed, and her gestures are saying, "What is this woman going to tell me about painting and sculpting?"

So how can we give them an explanation that works for them?

For those people, I want you to see this work. It's a portrait by Kumi Yamashita.

When you take a step forward and get closer, you're forced to look at the work and ask yourself what it is that you're looking at.

Ask the right questions—e.g., 'What is this work?

Painting? Sculpture? the material is? "such as

if you have any doubts

You'll notice that the whole piece is made up of one wooden board, ten thousand nails and one thread.

Some of you might be interested, but how does this work relate to people's work?

The answer is "in all respects"

Because we have to be good at interacting with different people on a daily basis and asking ourselves what we see.

Learning how to ask questions that give you the information you need to do your job is an important life skill.

For example, one radiologist told me that focusing on the blank spaces in a painting can help him find subtle abnormalities in MRI images.

One police officer told me that understanding the emotional dynamics between the people in his paintings helped him read body language in domestic violence situations and think twice before pulling out a gun and firing.

What's more, parents, by realizing that painting has no color, have learned that what their children say is just as important as what they don't say.

So how did I develop my visual intelligence?

The method can be summed up in four A's.

When a new situation or problem arises, we practice the 4 A's.

Assess the situation first

I ask what is in front of me

then analyze

what is important—

Think about what you need and what you don't

Then articulate in the form of conversations, notes, sentences, and emails.

Finally act, make a decision

You do this many times a day, without realizing the role that seeing and understanding plays in this sequence, and how much your visual intelligence improves everything.

The other day, I had counter-terrorism officials at a museum stand in front of this painting.

It's El Greco's "Christ Driving the Merchants Out of the Temple." In the center of the painting, Christ is waving his arms and using violent gestures to drive sinners out of the temple.

We asked the counter-terrorists to look at this picture for five minutes, and in that short period of time they were able to assess the situation, analyze the details, and put into words what they would do if they were in the scene.

As you can imagine, there is a difference between observation and insight.

Who would you speak to?

Who are the most important witnesses?

Any potential witnesses?

Who's sneaking around?

Who has the most information?

My favorite comment was from a seasoned police officer. He looked at the person in the center of the screen and said, "You see that guy in pink?"

(Laughter) Art gives us the best way to rethink how we solve problems without relying on technology.

When you look at the work of Felix Gonzalez-Torres, you notice two clocks running exactly at the same time.

The hour, minute and second hands are perfectly aligned

The clocks stand side by side and stick together The title is "Untitled (Perfect Lovers)"

If you take a closer look, you'll notice that they're both battery-powered watches, and you'll understand, "Wait a minute...

Someday one battery will run out before the other

If one of the clocks someday slows down first and stops, the symmetry of this work will be destroyed."

Putting your thought processes into words includes thinking about what you might need to do in an emergency.

The unforeseen, the unexpected—preventing the unknown is necessary no matter when or how it happens.

Using art to increase your visual intelligence can help you prepare for the unexpected, understand both the big picture and the details, and notice the missing.

In this painting by Magritte, realizing that there is no track under the train, no fire in the fireplace, and no candles in the candlesticks, is a more accurate depiction of the picture than if we had just said, "The train comes out of the fireplace, and the candlesticks are above the fireplace."

Listing things that aren't there might sound a bit counterintuitive, but it's actually a very useful method.

In North Carolina, a detective who had studied visual intelligence was called to the scene after a fatal boating accident, according to eyewitnesses, who said the boat had capsized and the people on board had drowned under it.

Criminal investigators instinctively look for what they can see, but this detective did it differently.

I was looking for something that wasn't there, which is more difficult.

And I wondered, if the boat did indeed capsize, as the eyewitnesses said, how come the papers stored on the edge of the boat weren't wet at all?

This one small but important observation changed the course of the investigation from fatality to homicide.

Just as important as listing the missing is the ability to find visual connections where they aren't obvious.

For example, Marie Watt's blanket totem pole.

This work shows how finding hidden connections in the things we use every day can be deeply resonating.

She received blankets from so many different people in her community, and asked the owners to write on the tags what the blanket meant to her family.

Some blankets were used for babies, some were used at picnics, some were for dogs.

Every home has blankets, and we understand the role that blankets play.

Similarly, I tell new doctors, when you walk into a room, before you pick up your chart, look around the room.

Do you have balloons and get well cards? Are there special blankets on the bed?

Doctors can see from there that there is a connection to the outside world.

If the patient has someone in the outside world who can help and help, the doctor can keep that connection in mind and provide the best care.

In medicine, people are connected as people before they are doctors and patients.

But this method of sharpening your perception doesn't have to be revolutionary or completely change your perspective.

Jorge Mendes Blake's sculpture, which builds a brick wall over Kafka's novel The Castle, shows that a keen eye can be both subtle and important.

You can see there's a book, and you can see that it's disrupting the symmetry of the bricks that are stacked directly above, but when you move to the edge of this sculpture, you can't see the book.

If you look at this work as a whole, you can see that the disturbance that the book brings to the brick is subtle but obvious.

One thought, one idea, one innovation can change approaches, change processes, and even save lives.

I've been teaching visual intelligence for over 15 years, and what's really amazed me -- and I think it will continue to amaze me for the rest of my life -- is that I've seen how critically looking at art helps us find our place in the uncharted realm of the world, whether it's being part of an organization like the military, or a caregiver, a doctor, or a mother.

because things don't go well

(Laughter) It doesn't work.

Don't get me wrong, I would eat that donut right away.

(Laughter) But we just need to understand the consequences of what we've observed, and translate observable details into actionable knowledge.

For example, Jennifer Odem's table sculpture stands guard on the banks of the Mississippi River in New Orleans, guarding against recurring floods like Hurricane Katrina and facing adversity.

I've explored the art world and helped people from all walks of life find something special in their everyday lives, and try to put into words what's not there, to inspire creativity and innovation, no matter how trivial.

Most importantly, we're trying to build connections between people that may not be visible to the naked eye, empowering everyone to see their work and the world in new ways.

thank you

(applause)

Let's start with a simple question: Why do people with no money make so many thoughtless choices?

It's a tough question, isn't it, but the data shows it.

Poorer people have more debt, save less, smoke more, exercise less, drink more and eat less healthy.

Why?

Former British Prime Minister Margaret Thatcher summed up what the public thinks the answer is.

"Poverty is a character flaw," he said.

(Laughter) So it's a lack of personality.

First of all, you wouldn't make such a blatant statement

But Thatcher isn't the only one who thinks there's something wrong with the poor.

Some people would argue that being poor is self-inflicted, that it's self-inflicted.

Others would say that we should help them make the right choice.

Both ways of thinking are based on the same hypothesis: there's something wrong with the person.

"If only I could change him" "If only I could teach him how to live" "If only I could listen to him"

To be honest, I've always thought that myself.

It wasn't until a few years ago that I realized that everything I thought about poverty was wrong.

It all started when I happened to discover a paper by several American psychologists.

It's about traveling about 13,000 kilometers and doing some very interesting research in India.

The subject of the study was a sugar cane farmer.

In fact, sugar cane farmers collect 60 percent of their annual income in one go, right after harvest.

So there are periods of the year when we're relatively poor and other periods when we're relatively wealthy.

The research team had farmers take intelligence tests before and after harvest.

I was stunned by the facts that were revealed

Pre-harvest performance was much lower than post-harvest performance.

It turns out that the effect of living in poverty is the same as dropping your IQ by 14.

In layman's terms, it's kind of like the state after an all-nighter or alcoholism.

A few months later, I heard that one of the authors of this study, Elder Schaffia, a professor at Princeton University, was visiting my home in the Netherlands.

I met him in Amsterdam to hear about the professor's groundbreaking theory of poverty.

In a nutshell, poverty is the psychology of scarcity.

It is said that when people recognize their lack, their behavior changes.

It doesn't matter what you're lacking: time, money, food, whatever.

I'm sure you've all experienced it when you have too much to do, or when your blood sugar plummets because you've delayed your lunch break.

You can't see anything other than the immediate shortage, like a sandwich you want to eat right now, a meeting coming up in five minutes, or a bill you have to pay tomorrow.

This paralyzes your ability to think ahead.

It's like running 10 heavy programs at the same time on your new computer.

It's getting slower and slower and throwing errors

In the end, it freezes, not because the computer itself is bad, but because there are too many things to do at the same time.

poor people have the same problem

It's not because he's stupid that he's making stupid choices, it's because he's in a situation where anyone can make stupid choices.

It suddenly dawned on me that this was why anti-poverty programs were failing.

For example, there are many cases where spending money on education has no effect at all.

Poverty is not a lack of knowledge

A review of 201 recent studies looking at the effectiveness of money management courses found that the effectiveness was near zero.

But don't get me wrong, it doesn't mean that poor people don't learn anything. Hard work does make them smarter.

but that's not enough

As Professor Shafia once said, "It's like trying to teach someone to swim and then throwing them into a stormy sea from the start."

i was confused when i heard that

I thought it was a conclusion that was drawn decades ago.

The psychologists who studied farmers didn't need complicated brain scans, they just measured workers' intelligence quotients. Intelligence tests were invented over a hundred years ago.

In fact, I had read about the psychology of the poor before.

George Orwell, one of the world's greatest writers, experienced poverty himself in the 1920s.

Orwell wrote, "The essence of poverty is that it crushes the future."

Out of my own amazement, I also wrote, "How many people, as soon as they see someone whose income is below a certain level, start preaching and praying as if it were their right."

It's a word that's very applicable today.

Of course, everyone must be thinking the same thing, "What should I do?"

Modern economists have proposed several measures.

Helping with paperwork, texting my cell phone to remind me to pay my utility bills, etc.

It's a solution that modern politicians are very fond of, mostly because it's so cheap.

I think these kinds of solutions are very representative of the modern world: they focus on the symptom and don't look at the root cause.

So I thought, why don't we just change the situation of the poor?

Also, using the analogy of a personal computer, wouldn't it be easy to solve this problem by adding memory instead of messing with software?

Then Professor Shafia's face turned blank.

After a few seconds, he said, "Oh, I get it.

So you're trying to say that poverty can be eradicated simply by giving money to the poor?

well...that would be great

Such a left-wing policy might work in Amsterdam, but it doesn't exist in America."

But is this really a socialist antiquated idea?

And what I'm reminded of is an idea put forward by some of history's leading thinkers.

We see evidence of this idea in the philosopher Thomas More's "Utopia," a book more than five hundred years old.

Adherents to More's theory range from left to right, including civil rights activist Martin Luther King and economist Milton Friedman.

It's an incredibly simple idea: a basic income security.

Its contents

well it's easy

The income necessary for basic living such as food, a place to sleep, education, etc. will be provided monthly.

It's a complete unconditional benefit, so no one can tell you what you have to do to get it or what you have to do with that money.

Basic income security is not a favor, it's a right.

Nor is it dishonorable or anything.

As I learned more about the nature of poverty, I began to wonder, "Is this the solution that humanity has been waiting for?

Is it really that simple?"

For the next three years, I read all the literature on Basic Income Security.

After researching dozens of experiments around the world, I soon stumbled upon the case of a city that actually achieved zero poverty.

but then

almost completely forgotten

It all started in the city of Dauphin in Canada.

In 1974, everyone in this small town had a basic income, with the goal of ensuring that no one lived below the poverty line.

At the beginning of this experiment, many researchers flocked.

Four years, everything was fine

But then a new government came into being in Canada, and the new government saw little point in this expensive experiment.

And it became clear that there was no budget left to analyze the results, so the research materials were sorted and put away in more than 2,000 boxes.

Twenty-five years later, a Canadian professor named Evelyn Fojay dug up the records.

Over the course of three years, he subjected the data to all sorts of statistical analyses, but no matter what he did, each time he came to the same conclusion: the experiment had been a resounding success.

The professor's research revealed that the Dauphin residents gained not only wealth, but also wisdom and health.

Children's performance in school has improved significantly.

The number of people admitted to hospital decreased by 8.5%

Less domestic violence, less people complaining of mental health problems.

Residents didn't even quit their jobs.

The only people who worked a little less were women who had just given birth and students, because they had more years of education.

Countless other experiments have been conducted around the world with similar results, from the United States to India.

So I

I came up with the following idea

When it comes to poverty, those of us with money should stop pretending to know.

Stop sending shoes and stuffed animals to people you've never met.

Get rid of this huge industry run by bureaucratic guardianship bureaucrats, and give those poor people the salaries they need to help.

(Applause) Because the great thing about money is that you can buy what you think you need, not what some unsolicited expert thinks.

Imagine how many brilliant scientists, entrepreneurs, and writers -- Orwell is a good example -- at this very moment, in poverty, languishing in poverty.

If we could finally eradicate poverty, how much power and talent would we unlock?

Basic income security should have the effect of venture capital for people.

If you don't do it, you're going to lose a lot, because poverty is very expensive.

Take, for example, the cost of fighting child poverty in the United States,

It's estimated to be as high as $500 billion a year, and that's what you're calculating when you factor in health care costs, school dropout rates, and rising crime rates.

This is a colossal waste of human potential.

But let's get to the heart of the matter that everyone looks away from.

How the hell can you come up with the money that guarantees your basic income?

It's actually a lot cheaper than you might think.

What they did in the Dauphin is they introduced a "negative income tax."

It's a mechanism that provides extra income to people who fall below the poverty line.

In this scenario, the best estimate by modern economists is that the actual cost of $175 billion -- a quarter of America's military spending, or 1 percent of GDP -- would lift all the poor in America above the poverty line.

Poverty eradication comes true

this should be the goal

(Applause) The days of small donations and small donations are over.

It's time to come up with some radical new ideas. Basic income security means a lot more than just policy.

It's also fundamentally upending the notion of what a job is.

So in that sense, it's not just freeing the poor, it's freeing all of us.

These days, there are millions of people who say they can't find meaning or meaning in their work.

A recent survey of 230,000 office workers in 142 countries found that only 13% actually liked their jobs.

Another survey found that 37% of UK office workers doubt their job even exists.

Quote by Brad Pitt in Fight Club: "Too many people do jobs they hate to buy junk they don't need."

(Laughter) And don't get me wrong, I'm not talking about teachers or garbage collectors or care workers.

It will be hard if people like that are gone.

What I mean by unnecessary work is a highly paid businessman with an impressive resume at a "peer-to-peer" business strategy meeting.

"Brainstorming" on "creation of added value in the Internet society" and "innovative co-creation of value" - "brainstorming" on "innovative co-creation of value" (laughs)

(Applause) That kind of work.

Because it's funny how much talent we're wasting, because in the first place we teach our children to work to live.

As a math genius working at Facebook lamented a few years ago, "What the best minds of my generation think is above all how to get more clicks on web ads."

i am a historian

If there's anything we can learn from history, it's that we can change the world.

There is no such thing as force majeure in human-made social and economic structures.

Ideas can and do change the world.

Especially in the last few years, it's become so poignant that we can't just stick to the status quo and we need new ideas.

Many of you may be pessimistic about the future of widening inequality, xenophobia, and climate change.

But it's not just what you're against

You should also consider what you are for

Dr. King never said, "I have nightmares."

(Laughter) He had a dream.

(Applause) So

This is my dream. I believe in a future where people's work is not worth what it pays, but the happiness it spreads and the meaning it gives to others.

In the future, I believe, education is not the preparation for the mundane, useless job, but the preparation for the good life.

I believe in a future where living without poverty is not a privilege, it's everyone's right.

Now the point is

from here

We have the research, we have the evidence, we know how to do it.

And it's been more than 500 years since Thomas More advocated basic income security, and it's been more than 100 years since George Orwell pinpointed the nature of poverty.

poverty is lack of money

thank you

(applause)

confess

I've been "in a relationship" since I was 17.

It would have been nice if I could have talked about things like my heart pounding when I think of "him," or fidgeting, and scribbling on the ground with my feet, but that's not possible.

I wish I could talk about the sweet words and gifts "him" gave me, but I can't.

All I can tell you is what happened when we started dating, and that's the story of the days when I kept asking myself, "Why me?"

I remember how it all started

It was my senior year of high school, and my class won a sports game, and we sang and danced and hugged with other kids.

i went to take a shower

then went to dinner

And when I sat down to eat, my teeth started chattering and I couldn't get the spoon into my mouth.

I rushed to the infirmary.I couldn't speak, so I pointed to my mouth.

The nurse couldn't figure out what was going on and told me to lie down. This worked. After a few minutes, the chattering of my teeth was gone.

As I was about to run out of the room, the nurse said, "No! Go back to your dormitory and get some sleep."

At the time, I was in my final year of high school, only a few months away from my final high school exams, and a few days before what we call "mocks" here in Kenya.

I can't sleep or anything and let the exam "mock my effort"

I went to the classroom, took a seat, and pulled out my Kenyan history notebook, and my mind flew to a coastal town in Kenya, where I was with the great Mekatirili wa Menzah, the Giliama woman who led her people and resisted British colonial rule.

And then, completely without my knowledge, my left arm began to move, as if I was circling an invisible answer.

Spinning, spinning, each time my arm moved, my classmates looked up from their textbooks and started looking at me.

I tried so hard to stop it, but I couldn't. It felt like my arm didn't belong to me.

And then, with everyone undoubtedly looking at me and my arm, I had my first full-blown seizure, like a final show and an introduction, and that was the beginning of our 15-year relationship.

Seizures are a hallmark feature of most types of epilepsy, and every time you have a seizure for the first time, you need to see a doctor to determine if you have epilepsy or if it's a symptom of another medical condition.

In my case, it was confirmed that I had epilepsy.

After spending a lot of time in the hospital and at home, I finally got back to school before my final exams.

I had a seizure in between exams, but I managed to get good grades and get into the University of Nairobi for a degree in actuarial science.

(Applause) Unfortunately, I had to drop out in my second year.

I didn't know how to deal with it, and I didn't have the right support from those around me.

I was lucky enough to get a job, but I had a seizure at work and was fired.

And I found myself asking all the time why this had to happen to me.

For a long time, I lived in denial about my illness, probably because of what I was going through. I dropped out of school and got fired from my job.

Or maybe it's because you've heard about epilepsy and the lives of people with epilepsy who can't live on their own, can't travel on their own, can't get a job, are social outcasts, are possessed by demons, and must be freed from it.

The more I thought about this, the more frequent the attacks. I couldn't move my legs, I couldn't speak slurred, day after day.

Two or three days after the attack, my head and hands were still twitching.

I was at a loss. I felt like I had lost everything, sometimes even the will to live.

(sighs) I was so frustrated.

So I started writing, because I didn't have anyone around me who could answer my question.

So I wrote about my fears and my doubts.

I blogged about the good days, the bad days, the bad days.

Soon, I started getting messages from people with epilepsy, their families, and people without epilepsy.

I used to ask myself "why me?" all the time, but I've changed into a person who can speak up not only for myself, but also for those who still can't express their feelings.

(Applause) Seizures have gone down significantly from two or three times a day to two or three times a year.

I -- (Applause) I went on, hired five people, and set up Kenya's first free mental health and epilepsy phone line.

And -- (Applause) I'm traveling to talk about my relationships and all the other things that people like me who live with epilepsy have been told are impossible.

Globally, 80% of Nairobi's population is diagnosed with epilepsy each year.

And they, like me, experience stigma and exclusion from society.

And so it's been my life's journey to continue these conversations, and I've continued to confess my "acquaintances" so that people without epilepsy know and always remember what I want them to do, and that if you remove the barriers of stigma and exclusion from society, like you, we can face whatever challenges life throws at us.

thank you

(applause)

This story begins in 1985. At the age of 22, I became a world champion in chess, beating Anatoly Karpov.

Earlier that year, I played what's called a simultaneous open game against 32 of the world's most powerful chess computers in Hamburg, Germany.

I won all of my games, but at the time, it was considered unsurprising to win against 32 computers simultaneously.

it was a golden age for me

(Laughter) Computers were weak and my hair was strong.

(Laughter) A mere 12 years later, I was playing against a single computer with my life on the line, and the Newsweek cover title was "The Human Brain's Last Stand."

I don't want to put pressure on you

(Laughter) From mythology to science fiction, the battle between man and machine has often been portrayed as a matter of life and death.

John Henry, a 19th-century African-American folk hero known as the "Hammermaster," competed against steam hammers to tunnel through rocky mountains.

The legend of John Henry is part of a long historical tale of mankind versus technology.

This competitive rhetoric is now commonplace.

Whether in battle or war, mankind is competing with machines.

Human jobs are taken away

Humans are being replaced by machines as if they disappeared from the earth.

Movies like "The Terminator" and "The Matrix" seem like nonfiction.

There are very few areas where humans can compete physically and mentally with computers and robots.

i wish i had a little more

But for me, it was both a blessing and a curse to become a literal legend in the human-machine race we still talk about today.

Twice in the most famous human-machine competition since John Henry, I faced IBM's supercomputer Deep Blue.

No one remembers, but I won my first game. (Laughter) (Applause) In Philadelphia, I lost my second game in New York the following year.

But I'm not going to complain

Those who climbed Mount Everest before Sir Edmund Hillary and Tenzing Norgay conquered it for the first time are not on the calendar of history.

And in 1997, I was still world champion, the year computer chess finally reached maturity.

Deep Blue has reached the summit of Mount Everest, which is me.

Of course, it wasn't Deep Blue that did it, but its creators: Anantalaman, Campbell Horn, Sue.

hats off to them

As always, machine wins mankind wins, and it's easy to forget that when man-made things surpass man-made things.

Deep Blue is the winner, but was it intelligent?

No, not at least not as intelligently as Alan Turing and other computer science pioneers hoped.

It turns out that chess can be defeated with brute force, if the hardware is fast enough and the algorithms are sophisticated enough.

Based on the output, Deep Blue would be intelligent at playing grandmaster-level chess.

But even with its incredible speed, 200 million calculations per second, Deep Blue's method was still a pipe dream to gain insight into the mysteries of human intelligence.

Soon machines will drive taxis and replace doctors and professors, but is that intelligent?

I would like to leave the definition of this word to philosophers and dictionaries.

What really matters is how we humans feel about coexisting and working with these machines.

When I first met Deep Blue in February of 1996, I had defended the world championship for over a decade, winning 182 matches for the world champion and hundreds of other matches against other top players.

I was able to anticipate others and myself

By observing your opponent's body language and looking into their eyes, you can gauge your opponent's movements and determine their psychological state.

And then I got to sandwich Deep Blue with a chessboard.

Immediately, I felt something different, something unsettling.

You might experience a similar feeling the first time you get into a self-driving car, or the first time your computer boss tells you what to do.

But when I played my first game, it wasn't clear to me what Deep Blue could do.

Technology could evolve by leaps and bounds, and IBM was investing heavily.

i lost the game

I couldn't help thinking that Deep Blue might be invincible.

Is my favorite game over?

These thoughts are human suspicions and fears, but one thing I knew for sure was that my opponent, Deep Blue, had nothing to worry about.

(Laughter) After a big blow in my first game, I tried to fight back, but I had a bad feeling about it.

In the end, I lost to the machine, but I didn't end up like John Henry, winning the game and then dying with the hammer in hand.

What became clear was that the world of chess still wanted a real human champion.

And even today — even as the latest free chess app for smartphones outperforms Deep Blue, people continue to play chess more than ever before.

Pessimists predicted that no one would pick up a game conquered by machines, but they were proven wrong, although as far as technology is concerned, pessimistic predictions have always been popular pastimes.

What I've learned from my experience is that if you want to get the most out of technology, you have to face your fears, and if you want to get the most out of humanity, you have to overcome these fears.

While licking and healing my own wounds, I got a lot of inspiration from playing Deep Blue.

An old Russian proverb says, "If you can't win, be a friend"

So I thought, if we're going to fight with the computer, what if we could have the computer on our side and join forces? Human intuition and computer computing power Human strategy and computer tactics Human experience and computer memory power

Wouldn't that make it the best game ever?

My idea came to fruition, and in 1998, under the name "advanced chess," I played a human-machine tag match against other chess masters.

In this first attempt, both failed to effectively combine human and machine skills.

Advanced chess has taken off on the internet, as evidenced by a so-called freestyle tournament in chess in 2005.

Grandmasters and fastest machines entered as teams, but the winners weren't grandmasters or supercomputers.

The winner was a team of two American amateur players operating three ordinary PCs simultaneously.

Their skill at effectively coaching computers eclipsed their opponent's grandmaster's deeper chess knowledge and the computational power of the vastly superior computer.

Here is the formula we arrived at

A weak human player + a computer + a good process beats a single, very powerful machine, but what's even more amazing is that it beats a human master + a computer + a bad process.

So what convinced me was that in order to give computers useful intelligence, they needed good interfaces to coach computers.

Human + computer is the present, not the future.

Anyone who uses online translation to get the gist of a foreign-language newspaper article knows that machine translation is far from perfect.

And we use human experience to try to make sense of machine translation, and machines learn from human corrections.

This model is prevalent in the fields of investment, medical diagnostics and security analysis.

When computers process data, calculate probabilities, and get to 80 or 90 percent accuracy, it's easier for humans to analyze and make decisions.

But in the case of a self-driving car, even if it's 90 percent or 99 percent accurate, no parent would use it to get their child to school.

So what we need is to add more decimal places.

Twenty years after his second match with Deep Blue, the sensational headline "The Human Brain's Last Stand" is becoming more commonplace as intelligent machines advance into different realms on a daily basis.

But unlike the old days when machines replaced livestock and manual labour, we are now in an era where machines are looking to replace humans with degrees and political clout.

As someone who fought a machine and lost, I want to let you know that this is great news.

At some point, all professions are destined to experience similar pressures, or else it means humanity has stopped progressing.

We don't have the choice of when or where to stop technological progress.

Progress cannot be slowed down

in fact we have to speed up

What our technology is good at is taking the difficulty and uncertainty out of our lives, and that's why we have to pursue more difficult and uncertain challenges.

machine has computing power

we have understanding

machine has instructions

we have a purpose

machine has objectivity

we have a passion

We shouldn't worry about what machines can do now.

The concern is what machines can't do today, because one day we'll have to rely on new intelligent machines to help us realize our wildest dreams.

And if that dream fails, if it fails, it's not because the machine's intelligence was too high or too low.

If there's a reason why dreams don't come true, it's because we've complied with the status quo and put limits on our ambitions.

Humanity isn't defined by a particular skill, like wielding a hammer or playing chess.

There is one thing that only humans can do

it is to dream

So dream big

thank you

(applause)

I would like to share with you something that my father taught me: "Nothing stays the same."

My father told me this lesson over and over again, and I've learned through hardships that it's true.

This is a picture of me when I was in 4th grade.

Here's a picture from a yearbook in a classroom at a school in Monrovia, the capital of Liberia.

My parents emigrated from India to West Africa in the 1970s, and I was lucky enough to grow up there.

I was nine years old at the time, I loved to play soccer, and I was into math and science.

At the time, I was living the kind of life any child would dream of.

But nothing stays the same

Civil war broke out in Liberia on Christmas Eve 1989.

This conflict started in the countryside, but within months, rebels have invaded our capital city.

Schools were closed and rebels occupied the international airport, where there was only one, and everyone panicked and started fleeing.

One morning my mother knocked on the door and said, "Raj, pack your bags and run."

We rushed to the city center and when we got to the airfield, we were split into two lines.

Our family was lined up on one side and wedged into the cargo hatch of the rescue plane.

I sat on the bench and was nervous

I looked out through the open hatch and saw hundreds of Liberians with children on their backs lined up in the other line.

We saw soldiers holding back people trying to board our plane.

they were not allowed to escape

we were lucky

I lost my belongings, but I emigrated to the United States and was helped as an immigrant by a support organization that rushed to help me.

He invited our family into his home and coached me.

And she helped my father open a clothing store.

When I was a teenager, I used to go to my dad's store every weekend to help him sell sneakers and jeans.

Whenever things were going badly, my father used to remind me that nothing is ever the same.

It was this phrase, my parents' perseverance, and the support organization that helped me get out of college and into medical school.

The war had dashed my hopes once, but thanks to all of you, I had the chance to pursue my dream of becoming a doctor.

my situation has changed

Fifteen years after I flew out of the Liberian airfield, those two lines still stuck in my head.

As a medical student in my mid-twenties, I wanted to return to my country and help the people I left behind.

But when I came back, my homeland had been razed to the ground.

Because of the war, there were only 51 doctors left in a country of 4 million people.

It's like having only 10 doctors in San Francisco.

If you got sick in the city with the few remaining doctors, there was still hope.

But in remote areas of the rainforest, I've seen patients die from non-fatal illnesses that could take days to get to the nearest clinic, because they came to me too late.

Imagine if your two-year-old child woke up one morning with a fever and suspected he had malaria, and the only way to get the medicine he needed was to take him to a river bank, put him in a canoe, paddle across the river, and walk through the jungle for a couple of days to get to the clinic.

One billion people in the world live in remote and remote areas, and all these advances in medicine and technology are just one step away from reaching people.

It has been thought that these areas are too far away to reach out.

Disease is everywhere, but access to healthcare is not.

Realizing that set my heart on fire

No one should die because they live far from doctors and clinics.

Any situation can be changed

And here a helping hand came not from outside, but from within.

appeared in the region

she is a musk

In the remote countryside of Liberia — where girls rarely finish primary school — Musu persevered.

She graduated from high school at age 18 and moved back to her hometown.

What I saw then was that children with serious illnesses like malaria and pneumonia were not getting the treatment they needed.

So she signed up to volunteer

Because there are millions of volunteers like Mus in remote areas around the world, we thought that local talent like her could be the key to solving the problem.

The way our healthcare system works, only nurses and doctors like me are allowed to diagnose illnesses and prescribe medicines.

However, nurses and doctors are concentrated in cities, leaving remote areas like Musu.

So that got us thinking: What if we could reshape the healthcare system?

What if community talent like Musu could become part of, or be at the heart of, a healthcare organization?

What if they could take on the role of bringing medical care from urban clinics to local families?

She was 48 when we first met.

I've never had a paying job in the last 30 years, despite my tremendous talent and perseverance.

What if we could use technology to help Mus?

What if we could invest in her to get real training, real medicine, and a real job?

In 2007, I started looking for the answer to that question, the year I was going to marry my wife.

We asked our relatives to refrain from giving us wedding gifts, and asked for donations instead, to raise money to start a non-profit organization.

Actually, I'm quite a romantic —

(Laughter) We ended up raising $6,000 and working with people from Liberia and America to start a non-profit organization called Last Mile Health.

The goal is to have health workers everywhere anyone can go.

By designing a three-step process of training, equipping and rewarding, we're going to invest more in Muss and volunteers to become community health workers who assist health care workers.

First, we trained Musu to prevent, diagnose and treat the 10 major diseases afflicting local families.

A nurse supervised and visited each month to mentor Mus.

And then we gave her the latest medical equipment, like this simple one-dollar malaria test kit.

Third, I appreciated the preciousness of Musu's work.

We made a deal with the Liberian government, paid her a salary, and gave her a chance to get a job that paid off.

she's really amazing

Musu has learned more than 30 medical techniques, including testing for malnutrition in children, using smartphones to find the cause of coughing in children, assisting people with HIV, and providing follow-up care for people who have lost an arm or a leg.

As part of our team, working as assistants to health care workers, community health workers are helping to extend much of what a family doctor does to places they can't go.

One of my favorite things to do is make patient visits with community health workers.

I met A.B. last year, and like Mus, A.B.

When he was in the eighth grade of junior high school, his parents died.

Orphaned, he dropped out of school.

We recruited A.B. last year and trained him as a community health worker.

While he was door-to-door, he met a baby boy named Prince, whose mother was unable to breastfeed, and by the time he was six months old, Prince was beginning to fail.

A.B. had just been taught how to use color-coded tape around his upper arm to diagnose malnutrition in children.

A.B. realized that Prince was in the red zone, a level that required hospitalization.

So he took mother and child to the river, got in a canoe, and paddled four hours to the hospital.

After Prince left the hospital, A.B. taught mothers how to give their infants nutritional supplements.

A few months ago, when A.B. took me to Prince, I was plump.

(Laughter) Prince is getting older and older, and he's starting to stand up, and he's starting to speak.

I am very inspired by community health workers.

I often ask them why they do this, and when I asked A.B., he said, "Sir, this is the first time I've had a chance to pick up a pen and write since I left school.

I feel refreshed.”

From the story of A.B.

A desire to help others can actually help you change your own situation.

I was struck by the sheer power of the will to serve our communities a few years ago when we were faced with a global catastrophe.

December 2013 — Something Happened in the Rainforests of Neighboring Guinea

An infant named Emile became ill with vomiting, fever and diarrhea.

The area where the child lived had sparse roads and a severe shortage of health workers.

Emile died, a few weeks later his sister died, and a few weeks later his mother died.

And the disease spread beyond the region.

It wasn't until three months later that the world realized that the disease was Ebola.

It was a matter of seconds, and months had already passed, and by that time, the virus had spread like wildfire across West Africa and around the world.

Companies closed, airlines started canceling flights.

At the height of the crisis, when 1.4 million people were at risk of contracting it and most of them were told they would die, I was on the verge of losing hope.

We gave health workers the masks, gloves, protective gear they needed to protect themselves from the virus, and taught them how to wear them while caring for patients.

I saw the color of fear in their eyes

I couldn't sleep at night with anxiety thinking about whether I had made the right decision to leave them there.

But while Ebola threatened humanity, Liberia's community health workers didn't give in to fear.

Everyone was doing the same thing as they usually do, taking care of their neighbours, at their request.

Health workers across Liberia learned about Ebola symptoms and worked with nurses and doctors to go door-to-door to find sick people and put them in care.

They tracked down thousands of people who may have been exposed to the virus and helped break the chain of transmission.

About 10,000 community health workers risked their lives to track down the virus and try to stop it from spreading.

(Applause) Ebola is now under control in West Africa, and we've learned a few things.

One is that rural medical vacuums can become breeding grounds for disease, putting humanity as a whole at great risk.

Also, the most efficient first aid system is actually a routine system, and that system should reach all areas, including remote areas like the one Emile lived in.

And above all, what we've learned from the courage shown by the Liberian community health workers is that people are not dictated by their circumstances, no matter how hopeless they may seem.

What determines a person is how he or she responds to situations.

For the last 15 years, I've seen the potential of an idea -- the idea of ​​turning ordinary people into community health workers, into everyday heroes.

I've seen this idea come to life everywhere, from the rainforests of West Africa to the remote fishing villages of Alaska.

Granted, community health workers aren't doing brain surgery, but they're making healthcare accessible to everyone, everywhere.

What next?

Millions of people are still dying from preventable diseases in remote areas around the world.

The vast majority of those people died in these 75 countries, highlighted in blue.

And what's clear is that by 2030, nearly 30 million lives could be saved by training groups of community health workers in just 30 life-saving skills.

30 health services could save 30 million lives by 2030.

This isn't just a theory on paper, it's what we're demonstrating.

In Liberia, after the Ebola outbreak, the government trained thousands of health workers like A.B. and Musu to reach children and families across the country.

It's been an honor to work with them, and we're currently working with a number of organizations in other countries to help them do the same.

If we could scale up our efforts in these countries, we could save millions of lives, and we could create millions of jobs.

But without technology, it's impossible.

Some people worry that technology will take away our jobs, but when it comes to community health workers, technology is essential to creating jobs.

Without technology — without this smartphone, without this quick test kit, we wouldn't have been able to recruit A.B. and Mus.

Technology is now helping us train faster and better than ever before.

As a doctor, I use technology to keep up to date and recertify.

Use smartphones and apps for online courses

But if A.B. wants to learn anything, he has to jump in a canoe and go to the training center.

Even when Musu comes to train, the instructor still uses the wall charts and magic to explain.

Why can't I give them the same way of learning that I do?

If we really want community health workers to learn life-saving skills and more, we need to change this outdated way of teaching.

Technology has the power to change the landscape

The digital education revolution led by Khan Academy and edX is spectacular.

I believe that a new era has arrived, that the digital education revolution and the community health revolution have come together.

This leads me to my TED Prize Wish.

My hope is that, with your help, we can create a global platform, the Community Health Academy, to train, connect, and empower people to form the largest pool of community health workers in history.

(Applause) Thank you.

(Applause) Thank you.

Here's an idea: we're going to create and collect the best digital teaching materials.

And we deliver that material to community health workers like A.B. and Muss around the world.

With video lessons on how to vaccinate children and online courses on spotting new epidemics, there will be no need for instructional wall charts.

We are also working to change the status quo of health workers being accredited and unrecognized and unrecognised, to a profession with the honor and authority of nurses and doctors.

In addition, we will create networks of companies and entrepreneurs who create new life-saving technologies, connect them with health workers such as Muss, and encourage them to contribute better to their communities.

And we will continue to persuade governments to include community health workers as a cornerstone of their healthcare plans.

We're currently piloting community health academies in Liberia and a few partner countries, but we plan to roll them out around the world, including in remote areas of North America.

By demonstrating the power of this platform, countries will be convinced that a medical revolution is indeed possible.

My dream is that this academy will contribute to the medical training that will help hundreds of thousands of local people reach out to people in their neighborhoods, and help reach hundreds of millions of people in remote areas around the world, whether it's the hamlets of the rainforests of West Africa, the fishing villages of remote Alaska, the hills of Appalachia or the mountains of Afghanistan.

If you agree with this vision, please visit communityhealthacademy.org and join the revolution.

If you are an individual, an organization you belong to, or someone you know who can help, please let us know as we are aiming to open this academy next year.

As I look around this room, I realize that this effort is not just our own effort, it's the work of other people.

There are many people here who are cooperating with this cause.

I feel very honored to be part of this community, to be part of a community that embraces the ideas of such a bold initiative.

I started thinking more and more about what my father taught me.

I became a father myself

I have two sons, and my wife recently became pregnant with a third child.

(Applause) Thank you.

(Applause) Recently, I was seeing a woman in Liberia who, like her wife, was pregnant for the third time.

But unlike my wife, she didn't have antenatal care when she gave birth to her first two children.

Her isolated forest settlement has been without medical care for a hundred years, until last year.

Last year, nurses trained their neighbors to become community health workers.

So I went out and saw this woman, who was in her second trimester, and as I pulled out the ultrasound machine to see the baby, she started talking about her two older children.

He turned to me and said, "Doctor, what's that sound?"

The sound was the heartbeat of a baby in her belly, the first time she had heard it.

Her eyes lit up, and it was the same glint in my eyes when my wife and I heard our child's heartbeat.

Throughout human history, disease was ubiquitous, but access to medical care was not.

But as a wise man once told me, no situation remains the same.

now is the time -

It's time for us to do our best together to change this situation.

thank you

(applause)

My job is to study unconscious behavior across society.

It's the behavior that we do on a daily basis, subconsciously, without even realizing it.

we personally do those actions every day

I hit my wife because I was angry with someone

I drank too much at parties because of worries

It's like being hurt and overeating.

When 300 million people do these things unconsciously, there are tragic consequences that no one could have imagined.

I would like to show you this through photos.

This one was recently completed, and from a distance it looks like a cartoon of a neo-Gothic polluting factory.

As you get a little closer, you start to see chemical plants, refinery pipes, and winding highways.

As you get closer, you realize it's actually just a bunch of plastic cups.

That's actually one million plastic cups on an American plane every six hours.

4 million plastic cups are used in a single flight and cannot be reused or recycled

not done in this industry

Now, this number seems small compared to the 40 million paper cups we use every day for coffee and other hot beverages.

40 million cups didn't fit the canvas, but 410,000 did, and that's 410,000.

Consumption for 15 minutes

When actually stacked, it looks like this

1 hour cup

A day's worth of cups

People look small down there

It's the same height as a 42-story building, and I've included the Statue of Liberty for comparison.

Speaking of justice, there's another disturbing phenomenon happening in our culture. America currently has the highest proportion of its population to prisoners of any country on earth.

One in four people in prison is an American incarcerated in the United States.

let me show you the numbers

2.3 million Americans were incarcerated in 2005

There are more now, but we don't have the numbers yet.

I'm going to show you 2.3 million real prison uniforms, each five cents thick.

It's so small that it's almost impossible to tell what it is. To show you 2.3 million garments, you need a canvas bigger than any printer in the world can print.

So I divided it into several panels, and it was 3.5 meters long and 7.5 meters wide.

It's in a gallery in New York, and this is what my parents are looking at.

(Laughter) This makes me feel like my mother is whispering to my father that my son is finally folding his laundry.

(Laughter) Now I'm going to show you a piece about addiction.

this is about tobacco addiction

Let me show you the actual number of Americans dying from smoking.

More than 400,000 Americans die each year from smoking.

This work is made up of many cigarette boxes.

If you step back slowly, you can see Van Gogh's "Skull Smoking a Cigarette."

Considering the reaction when 3,000 Americans died in the September 11th tragedy,

it's funny

This incident resonated around the world and will continue to have an impact.

I will be able to continue talking 100 years from now

But on the same day, 1,100 Americans die from smoking

The next day, 1,100 Americans

Since then, 1,100 people have died each day.

1,100 Americans die today from smoking

we don't talk about it, we don't care

Because the tobacco group is too strong

We push the harm of tobacco out of our consciousness

Knowing how destructive it is, we provide our daughters and sons with the environment to start smoking.

This is the theme of the next work

It's made up of 65,000 packs of cigarettes, which is the same number of teens who start smoking this month and every month.

More than 700,000 children under the age of 18 start smoking in America each year.

I want to let you all know that the strangest disease in America is the abuse and misuse of prescription drugs.

Here's a video of a bunch of Vicodin (painkillers)

It's actually one Vicodin that's been copied over and over again --

(Laughter) If you look away, you can see 213,000 Vicodin, which is the same number of emergency room visits in the United States for abuse and misuse of prescription painkillers and anti-anxiety drugs.

One-third of all drug overdoses in America, including illicit drugs such as cocaine, heroin and alcohol, are prescription drugs.

it's a funny phenomenon

This is a work that I just completed recently about another tragic phenomenon, the growing number of women wanting breast implants.

384,000 American women had breast implants last year.

This is fast becoming the most popular high school graduation gift given before going to college.

I made this image out of Barbies, and it's shaped like a flower, but if you look far enough away, you can see 32,000 Barbies, which is the same number of breast implants that are performed in the United States each month.

The majority of them are women under the age of 21

And the funny thing is, the only procedure more popular than breast augmentation is liposuction, which is mostly performed on men.

I want to emphasize that these are just examples.

not the biggest point of contention

just an example

The reason I give these examples is because I fear that our society as a whole is losing its senses.

America is currently in a state of paralysis.

We have lost our anger, resentment, and sadness at what is happening in our country and culture right now, and at the injustices we are doing to ourselves around the world in the name of America.

these feelings are gone

Cultural and national pride is nowhere to be seen

I think part of that is because we, as individuals, try to build a worldview that sees things as interconnected, a worldview that envisions all the things in the world all at once, the environmental impact of what we buy a thousand miles away, or the consequences of our consumer decisions on society 10,000 miles away.

To build this worldview and to grasp the enormity of our culture, these numbers that we have to face are millions, billions, billions, now trillions.

Bush's new budget is trillions of dollars, a number that we don't know.

You can't make any sense out of these giant stats

What I'm trying to do with my work is to translate these numbers and statistics, the raw language of the data, into a more universal and tangible visual language.

Because I believe that if we could feel more deeply, these issues would be more important to us than they are now.

And if we can do that, then each of us will know what it takes to solve the big question, "How do we change?"

And that's the big question that we humans are facing right now: How should we change as a culture? How should we change our behavior and how should we take responsibility for small solutions that individuals can do?

I don't think we should blame ourselves for these problems.

I'm not blaming America by name.

this is who we are now

If there's something about our culture that we don't like, we have options.

It will depend on how sincere we are in trying to solve this problem, and how strong of a sense of morality we face in order to improve. This challenge will define and define who we are as individuals and as a nation.

And it will profoundly affect the well-being and quality of life of the hundreds of millions of descendants who inherit the consequences of our choices.

This isn't an ideological story, it's about ourselves in this room right now.

thank you

(applause)

(Prelude) (Sophie Holley-Weld) You don't have to get up, but —

You can see everyone from here (laughs), so you have to dance.

We have these dance moves — (Betta Remi) because it's so easy.

(Sophie) I'm going to turn my wrists like this.

(Prelude) I know I didn't raise my wrist I know I didn't catch it It came and went I won quickly and was there but I stopped Awoo!

I know I didn't raise my wrist I know I didn't catch it It came and went I won it quickly I was there but I stopped Awoo!

(Betta) Come on guys

(Interlude) (Sophie) There's one more

It's a pointing dance

(Interlude) Please point to the person sitting.

yes

I know I didn't raise my wrist I know I didn't catch it It came and it went I won it quickly I was there but I stopped Aaaa...

(Applause) Awoo!

(interlude) (clapping) (clapping) Aaaa...

(Sophie) hand back

I know I didn't raise my wrist I know I didn't raise my wrist I didn't catch it It came and it went Gone I know I didn't raise my wrist I didn't catch it

(laughs) (interlude) Awoo!

(Applause) (Sophie) Thank you.

(applause)

Silicon Valley is obsessed with disruption, but it's not Silicon Valley that's sparking most of the disruption these days.

Ohio's steel towns, Pennsylvania's rural towns, originating from northwestern Florida.

The most recent US presidential election was truly the birthplace of destruction.

Politics shook personal sentiments again this time

Millions of Americans turned into activists overnight, and the largest number ever flooded the streets in the fastest time ever.

(Laughter) The election has completely transformed the holiday family dinner, much like Uber did to the taxi industry in New York City.

The couple broke up, the marriage fell apart

The election is having the same impact on my personal life that Amazon has on malls.

These days, the ACLU is also on the front line 24/7, and I can slip away for a moment and run a few miles on the treadmill, and the heart health benefits make the headlines, and the president's tweets wipe them out in an instant.

I feel that my secret enjoyment of appreciating Italian art has been affected by politics.

In fact, I'm so in love with the classic masters that I chase them around.

My desk is filled with postcards, mostly of famous and unknown paintings from the Italian Renaissance.

Art viewing used to be a way of escaping the turmoil of the political world that is the daily work of the ACLU, but that's changed recently.

When I attended the Women's March in San Francisco, the day after the presidential inauguration, the people were shouting, "This is what democracy looks like."

"This is the true face of democracy"

As I held up a placard and held an umbrella in the rain, an old painting popped into my head.

To remember the details, I ran my memory through real-life paintings of good governments and bad governments.

It was like being provoked by a classic master.

Want to see the true face of democracy?

Then take another look at my frescoes.

so i did

Ambrogio Lorenzetti completed a colossal work commissioned in 1339 for the Administrative Council Chamber in the Palazzo Publico in the city of Siena.

This work speaks to us even today, it is a work that appeals

"Art is the lie that makes us realize the truth." Pablo Picasso said.

As we search for the truth about government, we should think of Ambrogio's work as the eye of our collective mind, not as a lie, but as an allegory.

During Lorenzetti's time, Italian city-states were frequently questioned for their political legitimacy.

The city of Siena was a republic, but for about 20 years before the work was commissioned, it was plagued with massive social unrest.

Lorenzetti's intended audience was the political leaders of the city of Siena, who ruled the country under the gaze of these allegorical figures.

He cataloged the obligations of the ruler to those ruled.

I could spend years studying this mural.

In fact, some scholars have devoted themselves to such studies.

I'm not an art historian myself, but it's true that I'm passionate about art, and a work of this magnitude overwhelms me.

So let's focus on the big factors first.

This is an allegory of good government

The majestic figure standing in the middle, dressed in the colors of Siena, symbolizes the city-state.

Lorenzetti named this person "Commune" (autonomous city) and told the people of Siena that the people should rule the country themselves, not the king or the oppressor.

Surrounding the commune are his advisors

"Justice" is on the throne.

She looks up to the figure of Knowledge, which holds the scales of justice.

"Republic" or "Harmony" has a loose thread from the scales of justice that binds her to her people, representing that they are all brothers and sisters of the nation.

Finally, when we turn our attention to “peace,”

It's like listening to Bob Marley when she's laid back.

When a good government rules a country, "Peace" is sweat-free and secure.

These are big ideas for big icons, but I like the small ones.

On another wall, Lorenzetti painted the effect of good government, but its impact on the realities and daily lives of citizens is so mesmerizing in detail.

In the countryside you see hills neatly plowed

Crops are sown, fields are raised, harvested, milled and plowed, all in one picture.

Harvested crops and livestock are collected at the market

In the city, builders build towers

Citizens attend events like Law Courses, 14th Century TED Talks

(Laughter) Schoolchildren play

merchants prosper

The joyful dancers are portrayed especially powerfully.

Overlooking that nation is the winged 'safety' The words written on the banner are 'everyone will come and go freely without fear'.

The beauty of this 800-year-old image is that it's still a familiar scene today.

represents the face of democracy

We experience the effect that good government has on our lives in the same way that Lorenzetti did.

But since November 9th, the allegory of evil government has stuck with me.

It's badly damaged, but it's telling the same story as today's newspapers.

It is not Kommune who holds the control of the evil government, but a single "tyrant".

With horns, thorns and cross-eyed appearance, hair is braided

It looks like you've put a lot of time into this hairstyle.

(Laughter) Here, at his feet, Justice lies miserable and chained.

the balance is broken

"Tyrant"'s number one enemy "Justice" has been taken away

Surrounding the "Tyrant", Lorenzetti painted the figure of vice that enlivens vice.

The old woman who holds the safe firmly in one hand is greedy, and in the other hand she holds the fisherman's crochet, with which she attracts wealth.

Conceit holds the mirror, and Lorenzetti is here to warn against narcissistic leaders ruled by pride and vanity.

To the right of "tyrant" is "cruelty"

"Rebellion," which has two forms, sheep and scorpion, provides a false sense of security and poisons the nation.

Having fickle bat wings is a fraud

"Division" is lined up on the left of the tyrant

She too wears the colors of Siena

"Si" (agree) and "No" (against) are painted on the body

I cut the body in half with a carpenter's saw.

"Rage" wields the weapon of the masses, stone and sword

In the rest of the fresco, Lorenzetti expresses the inescapable influence of bad government.

Here it becomes clear that the civic ideals celebrated on the other walls of this conference room have been betrayed.

Towns that were once beautiful have fallen into disrepair, the countryside has become barren, farms have been abandoned.

Many of them are on fire

In the sky overhead is not winged safety, but terror, and the words on the banner are: ``No one can walk this road without fear of death.''

The last image, which is the most important, is actually not painted by Lorenzetti.

it is the viewer of this mural

Today, the viewer of Lorenzetti's frescoes is not the one who rules, but the one who is ruled, who stands before the allegory he painted, who takes the insight he gains from his work and translates it into action.

Lorenzetti warns us not to overlook the shadows of greed, deception, division, and tyranny as they fall into view of our political landscape, especially when they are cast by political leaders masquerading as the voices of good government, vociferously promising to make America great again.

we must act

Democracy is not watching sports

The right to protest, the right to assemble freely, the right to petition the government, these are not just rights.

It's our duty to fight greed, fraud, and division.

What we need is -- (Applause) what we need is to change the way we live and stop the immoral concentration of power in the hands of those who violate our values.

We, the people, need to promote justice, bring peace to our nations, and work together in unity. We have a choice.

Will you turn Lorenzetti's nightmarish picture of an evil government into reality, or will you go out into the city, where it's destructive, chaotic, and bustling?

This is what a democracy should look like

thank you

(Applause) Chris Anderson: All I can say is, "Wow."

Of course, you've reached a lot of people with your passion -- you've brought your passion to a lot of people here.

Some would argue that Trump won the election with the support of 63 million people.

I can't say he's perfect, but I appreciate the effort he puts into doing what he's supposed to do when he's chosen.

Shouldn't we give it a chance?

Anthony Romero: What we have to recognize is the difference between his legitimacy as president and the legitimacy of his political ideas.

When many of his policies run counter to basic ideals -- that all people are equal before the law and are not discriminated against because of the color of their skin or their religious affiliation -- we need to challenge those ideals, even if we recognize and respect the fact that democratic principles have elected a president who upholds those values.

Chris: The ACLU is not just an organization that represents the power of the left, is it?

there are other discussions

Anthony: As you know, what we do is often antagonized.

that is our duty

For example, I recently supported Ann Coulter's right to speak at Berkeley and Milo's freedom of speech.

I also wrote on my blog that, unfortunately, it almost splintered some of my members. What I wrote was that Donald Trump, as president, had free speech, and that it was unconstitutional and anti-American to hold him accountable for what he said and did to incite violence at marches and rallies in support of him.

And you're going to put those opinions out there to the people who are frolicking with excitement to fight Donald Trump, and then you're going to say, "Wait a minute, this is everyone's right, and even the president we hate has this right."

that's our job

(Applause) Chris: Anthony, you've told so many powerful stories.

thank you very much

(applause)

(Toppling dominoes) (Toy car) (Rolling ball) The song This Too Shall Pass

If you don't have that much to carry around, you'd better start running like crazy as soon as the morning comes As soon as the morning comes I can't stop the young guys from dancing Why should I stop? Especially if you already have mine

(Glockenspiel) Don't criticize young people for being unmoved and for their knees not obeying.

(Metallophone) As soon as the morning comes As soon as the morning comes As soon as the morning comes As soon as the morning comes As soon as the morning comes As soon as the morning comes (Glockenspiel) Let it go Don't keep getting depressed As soon as the morning comes Don't keep getting depressed No, keep getting depressed Don't keep getting depressed as soon as the morning comes

We are OK Go and have been together as a band since 1998.

But over the last decade or so, he's become known for his elaborate music videos, videos for songs like the one you just saw.

I'll give you one more song later, but before I do, I'd like to answer a question I get asked all the time, and I've been having trouble finding a good answer for a long time: How do you come up with ideas like that?

By the way, not all videos are Rube Goldberg machines.

Last year, I danced in zero gravity, and there was an obstacle course in the desert made up of thousands of musical instruments that I would drive through and play with a car.

(Laughter) And in one video, I choreographed hundreds of people with umbrellas in an abandoned parking lot outside of Tokyo, and filmed it from 700 meters above with a drone.

People are interested in ideas like that, but the reason it's hard to explain how we come up with them is because we don't feel like we're coming up with them.

I feel like I've found

I don't know if it's an explanation, but I have an uncontrollable habit.

I've been playing with parallax and perspective with my eyes all the time, ever since I was a teenager.

One of the big reasons might be that when I was in high school, I used to decorate my room like this.

(Laughter) As a teenager, what I was doing in this room was just talking on the phone for an alarming amount of time.

In this visual maelstrom, most of the time I'm sitting in one place, and I think my brain is probably trying to make sense of the overload of information, like if I tilt my head a little to the side and the edge of the desk is perfectly aligned with the poster on the wall over there, or if I put my thumb up and alternately close my left and right eyes, my thumb goes back and forth between Jimi Hendrix's left and right eyes.

(Laughter) It's not like I do it consciously, it's kind of like scribbling while chatting, and that's what I do all the time.

This is my wife Christine — (Applause) Hi.

Woo woo!

It's not uncommon for us to go out to eat, but sometimes, in the middle of our conversation, she stops talking, and then I realize I've been doing something weird.

I was wondering if I could somehow make the fig tree over there grow out of her head like a ponytail.

(Laughter) And I'm telling you this because to me, this feels like an idea.

Various parts and lumps are scattered all over the place

If you're sensitive and observant, and most importantly being in the right place, you can match them.

If your job is to think of ideas like this, then ideas start to beckon you out there, like Jimi's eyes beckoning from a poster, or like the fig tree behind her.

Making music feels like a repeating process. There's a lot of sounds, a lot of grooves, a lot of chord progressions, and you're just looking for something out there, a puzzle piece that clicks into place.

And when it fits, I feel like I've found that piece of the puzzle, not like I figured it out, like I've figured out a connection or something.

But especially when it comes to video, we're usually looking for that feeling of "wow."

And there's always an element of surprise in that, so I'm not just looking for good ideas, I'm looking for ideas that surprise me in some way.

This poses a problem because —

The process of making things has a strong tendency to stifle amazing ideas.

The process I'm talking about is what people do all the time.

think of an idea first

Just sit down and come up with a great idea, and then come up with a plan to make that idea a reality.

With that plan in mind, you can revisit the original idea, refine it if you can, and then go back and forth from idea to plan, plan to idea, and finally have a great plan.

Only after I get that, I'll go out and do it.

It's a perfect system in terms of maximizing the use of resources, after all, ideas don't cost money.

This part costs very little, but this implementation part costs a lot of money, so at that point, we're ready and ready to squeeze out every last drop.

But there are problems with this, and the math reveals the biggest problem.

Let's go back to the video you just watched

That Rube Goldberg machine has about 130 moving parts.

So there are 130 things that need to be done according to plan.

Let's say you decide to create a new video that's just as complex, and that it has 130 moving parts.

If we're good planners, we might be able to ensure 90 percent reliability in every part of the system.

90% looks like a good number, right?

but no

It's actually terrible, do the math and you'll see

The probability that none of the 130 things fail is 0.9 to the 130th power.

If we calculate this

(Ching) 0.000001 This is a 1 in 10,000 percent chance of success, literally one in a million.

(Hugh) (Laughter) We don't want to make such a dead bet.

0.99 to the 130th power is

(Ching) It's 27%

I've become much better, to the point where I think I might be able to do this

But think

How many familiar things are 99% reliable?

And how can you gather 130 of those things in one place at the same time?

Even if you could, do you think it would be successful?

Do you think it will work?

In fact, you're three times more likely to fail than to succeed.

The bottom line is that if your project is fairly complex, as is the case with any ambitious project, and you have a lot of moving parts, then you can be 100% sure that you can just reconfigure a proven idea.

Let's put together something amazing Let's go back to me sitting there with a thumbs up

If the only thing you can think about is an idea that's been hit over and over again, I'm finished.

But there are workarounds. There are a lot of untested ideas out there, and a lot of them that have the credibility that we need.

So what we do is find places where untapped ideas are concentrated.

You try to find a sandbox, you bet tons of resources on it, and you play in that sandbox.

(Laughter) You have to trust that the sandbox process will reveal which ideas are both amazing and have a surprisingly high degree of credibility.

Here's an example of the sandbox we tried in the video.

Let's play with optical illusion

Let's dance on the moving ground

Bake toast with a laser cutter

Let's get on a zero-gravity plane and do something

Instead of sitting around and figuring out what that something might look like, I spent a whole third of my budget actually getting on the "vomiting comet" and bouncing between walls for a week.

This might look like a test, but it's not, because at this point we don't know what the idea is yet, and we don't have a plan to test it.

So I'm just playing around. I'm trying everything I can think of. I need to fill that idea space with chaos, like my room in high school.

If you bend down, shift your body, put your thumbs up, and you find something perfectly aligned (Ching), there's probably no one else who's matched it up until now.

And when we've finished a project like that, and people ask me how I came up with the idea, I'm at a loss for words.

I'm going to show you another video with live music.

It was a song called The One Moment, and the sandbox for that was ballistics and math.

I spent a whole month staring at a giant spreadsheet for that.

My playground is a table of 400 rows and 25 columns, and if anyone could understand that, it would be the people here.

(Laughter) There's nothing like a giant spreadsheet, right?

(laughs) Thank you everyone.

We are OK Go The song is The One Moment

(Applause) [In that moment] (Explosion) [What I just saw was real — it happened in the space of 4.2 seconds] (Video) Let me know when it's all right.

(percussion) [This is the same moment —

Thing slowed down] (Play) (Guitar) You're right There's nothing sweeter and more profound than the certainty that all this will end So put your arms out on me Open your arms out to me This will be the time that matters This will be the one that will be remembered This will be the reason we were here This will be the time that matters Oh...

(Guitar) While the mud backfills our footprints The bushes swallowing the road While our bones keep looking back If it wasn't for God's grace If it wasn't for the grace of time and opportunity And the cruel hand of entropy So spread your arms on me Spread your arms on me This will be the time that matters This will be the one that will be remembered This will be the reason we were here This will be the time that matters Oh...

So why don't you stay here with me Let's build until we have blisters Stay here with me Let's build a temple Let's build a castle Let's build a monument and burn it all down (interlude) It's gonna be a big time Let's make a temple It's going to be a big time Let's make a monument It's going to be a big time

Let's make a memorial, it's gonna be a big moment Oh... (Guitar) (Applause)

Zika Fever—The Newest Frightening Disease

What is it? Where did you come from?

What should I do?

It's a relatively mild illness for most adults: a low-grade fever, a mild headache, joint pain, and possibly a rash.

In fact, most people who get it won't even realize it.

But the more we know about the Zika virus, the more frightening it becomes.

For example, during the recent epidemic of this disease, doctors noticed frequent occurrences of something called Guillain-Barré syndrome.

In Guillain-Barré syndrome, your immune system attacks nerve cells, which can leave you partially or completely paralyzed.

Fortunately, it's very rare and most people recover.

But if you get infected while you're pregnant, you're in terrible danger.

baby with malformed head

this is a normal baby

This is an infant with microcephaly

the head is too small for the brain

and there is no cure yet

Exactly one year ago, doctors were the first to notice a spike in microcephaly rates after the Zika outbreak in northeastern Brazil.

It took doctors another year to confirm that it was caused by the Zika virus, but they are now convinced.

If you're a "don't believe until you see the evidence" type, go here [Zika virus and birth defects]

Where did it come from and how?

to America

Like many other viruses, it originated in Africa, specifically the Zika forest in Uganda.

Researchers at the nearby Yellow Fever Research Institute detected an unknown virus in monkeys in the Zika forest that gave it its name.

The first human cases of Zika appeared in Uganda and Tanzania a few years later.

The virus then spread across West Africa and then through Equatorial Asia to Pakistan, India, Malaysia and Indonesia.

But most were infected by monkeys and, of course, mosquitoes.

In the 60 years from 1947, when it was first identified, to 2007, there were only 13 reported cases of Zika in humans.

And then something extraordinary happened on the small island of Yap in Micronesia.

An outbreak that affected 75 percent of the population.

How did the virus get there? it's by air

Today, there are 2 billion passengers on commercial airlines.

An infected passenger can board a plane and travel halfway around the world before they develop symptoms, even if they do.

And when the passengers land, local mosquitoes start spreading Zika.

Zika then broke out in French Polynesia in 2013.

By December of that year, it was locally transmitted by mosquitoes.

It led to an explosive epidemic, affecting about 30,000 people.

and from there spread across the Pacific.

Outbreaks have taken place in the Cook Islands, New Caledonia, Vanuatu, the Solomon Islands, coastal regions of South America and Easter Island.

And in early 2015, we saw a surge of dengue-like syndromes in the northeastern Brazilian city of Natal.

The virus, not dengue, but Zika, spread rapidly, and Recife, a large Brazilian coastal city, quickly became the epicenter of the epidemic.

People speculated that it was the 2014 World Cup soccer fans who brought the virus to the country.

Others believed that Pacific Islanders who participated in that year's canoe racing championship in Rio brought the epidemic.

Only a year has passed since then

The virus is transmitted by mosquitoes in different regions, across South America, Central America, Mexico and the Caribbean, although until this year the thousands of diagnosed cases in the United States were spread elsewhere.

Since this summer, Miami has had endemic transmission.

Domestic infection

What should I do?

Infectious disease prevention is either protecting people or getting rid of mosquitoes.

Let's focus on people first

There is a means of vaccination

You can also avoid going to areas with Zika.

Or protect yourself with clothes or use insect repellent

We don't have a vaccine yet, so vaccination isn't an option, probably not for the next few years.

Locking yourself in at home isn't a surefire way either, because you can get it through sexual contact.

Covering the skin with clothes and applying insect repellent is effective.

I have to forget

(Laughter) So that leaves us with a way to get rid of mosquitoes, and that's by spraying insecticides.

Pesticides are toxic chemicals, and you need protective clothing, because they kill not only insects, but people.

But you still need more than you need to kill an insect.

These are pictures from Brazil and Nicaragua.

The scene is the same in Miami, Florida

And, of course, you can also spray pesticides from airplanes.

Last summer, pest control officials in Dorchester County, South Carolina, one day authorized the application of a pesticide called naled as recommended by the manufacturer.

That afternoon, a beekeeper told reporters that her apiary had been devastated.

It's bad

bees are good creatures

Florida citizens protested, but the spraying continued.

Unfortunately, the number of Zika cases also continued to rise.

because insecticides are not very effective

So are there other approaches that are less harmful than toxic chemicals and perhaps more effective than pesticides?

I'm a big fan of biological pest control, and Rachel Carson, author of "Silent Spring," which is credited with starting the environmental movement, agrees.

In this book, she gives an example of how a very nasty pest of livestock was exterminated in the last century.

Today, no one knows that amazing story.

So when [John] Bullock and I wrote an editorial about the current mosquito problem, I brought this up again.

You put a pupa inside the capsule -- a pupa is an immature insect that's been irradiated to make it incapable of producing offspring, and once it's grown to adulthood, it's then released from planes into the Southwest, then into the Southwest into Mexico and into Central America -- literally hundreds of millions of tiny plane-released worms that eventually wiped out most of the Western Hemisphere of that deadly pest.

The real intention of writing this editorial was to show the reader what can be done today, not with radiation, but with the knowledge of genetics.

let me explain

Aedes aegypti is the problem insect

It's the most common vector of disease, and it carries not only Zika, but also dengue, chikungunya, West Nile virus, and the ancient plague yellow fever.

Females get their hands dirty with urban mosquitoes.

Females stab people and suck blood for their young.

Males don't bite humans and don't have the ability to bite.

A small British company called Oxitec genetically modified the mosquito so that when it mated with a wild female, the eggs it laid would not develop.

This is what it is

this is a normal reproductive cycle

Oxitec designed mosquitoes so that the eggs don't hatch after the male mates with a wild female.

Sounds impossible?

Let me explain diagrammatically

Now, this represents the nucleus of the mosquito cell, and the tangle in the middle is all of its genome, its genes.

Scientists have added a gene to this that encodes a protein, represented by this orange ball, that keeps producing itself and feeding back into the genome.

And the extra copy sticks to the mosquito's gene and kills the mosquito.

We use a compound called tetracycline to keep mosquitoes alive in the lab.

Tetracycline silences the gene and allows normal development.

I added a little tweak to see what would happen.

We added a gene that made the bugs glow under ultraviolet light, and that allowed us to track mosquitoes with precision, and to collect data for scientific studies, such as how long they lived.

Now this is the pupal stage, because females are larger than males at this stage.

You can distinguish between females and males, and only males can be raised to adulthood.

Now remember that males don't bite.

From there it's pretty simple

They take a beaker full of male mosquitoes, put them in milk cartons, drive them around, and, guided by GPS, release them all over the city.

It's the mayor who's releasing the first batch of "Friendly Yabuka."

I would like to say that this is an American city, but it's not.

Brazilian piracicaba

And the amazing thing is, in that one year, they reduced dengue fever by 91 percent.

This is more effective than any insecticide

So why aren't we using this superior biodisinfection method in the US?

Because it's a genetically modified organism, a genetically modified organism.

See this subtitle, "If the US Food and Drug Administration (FDA) allows it, we can do the same here when Zika comes."

And of course Zika came

Let me tell you very briefly the long, long torture story of GMO regulation in the United States. In the United States, three agencies regulate genetically modified organisms: the Food and Drug Administration (FDA), the Environmental Protection Agency (EPA) and the United States Department of Agriculture (USDA).

It took them two years to come to the conclusion that it was the FDA that would regulate genetically modified mosquitoes.

I thought it made sense to treat it as a new animal drug.

It took another five years of endless back and forth to convince the FDA that this would not harm people or the environment.

Finally, this summer, I got permission to do a small experiment in the Florida Keys, where I was invited to do research when there was a dengue epidemic there a few years ago.

but it wasn't easy

When locals heard that experiments with genetically modified mosquitoes were going to be conducted there, some began to organize protests.

What's more, a petition started online with this kawaii logo, and it ended up with about 160,000 signatures, and they asked for a vote, which will take place in the next few weeks to determine whether the experiment itself will be approved.

Well, it's Miami that really needs a better way to control pests.

And people's thinking is changing.

In fact, just recently, a bipartisan group of more than 60 members of Congress called on Health and Human Services Secretary Sylvia Burwell to encourage access to this new technology in Florida at the federal level.

So biological control of insect pests is both more effective and more environmentally friendly than using toxic chemicals like pesticides.

That's true in the days of Rachel Carson, and it's still true today.

What's different is that we have a lot more information about genetics than we did then, so we can use that information for biodisinfection.

And I hope I've piqued your curiosity enough that you start your own research, not just about GM mosquitoes, but about other genetically modified organisms that are being discussed today.

And I think you'll be surprised and pleased when you dig into the information -- beyond the misinformation and the marketing information from parts of the organic food industry and Greenpeace -- to the exact science.

thank you

(applause)

I got a letter that said, "When I become famous, I want to tell you that there is a hero named Marlon Peterson."

far from being a hero

On the contrary, I am nothing but garbage.

But I don't like starting a speech or a conversation like this, and you're probably wondering.

Why is this man humiliating himself?

what do you mean

Is it possible for someone who calls himself trash to be seen as a hero by others?

I think we learn more from questions than from answers.

Because when you question something, you're forced to take the time to understand some new information, or you're confronted with the discomfort of ignorance.

That's why I'm here now. I want to ask questions, even if it makes me uncomfortable.

Trinidad and Tobago, the southernmost Caribbean island, is my parents' hometown.

It is the birthplace of the steel pan, the only musical instrument invented in the 20th century.

With its roots in African drums, it was perfected by the Lavantil people, one of the ghettos in Trinidad.

Well, I mean, during World War II, there was a US military base in Trinidad, and when the war ended, they left empty oil drums behind, which is garbage.

So the people of Labantil repurposed the old drums left behind to create a chromatic musical instrument: the steelpan.

Classical, reggae, hip-hop, it's now an instrument that's used in a variety of songs, and the people of Labantil made it out of garbage.

Twelve days before I turned 20, I was arrested in Lower Manhattan for attempted robbery.

There were customers at the cafe at the scene of the crime, but four were shot.

two people died

Five people were arrested, including myself.

All had their roots in Trinidad.

We were the so-called "bad immigrants," the kind of "anchor babies" hated by Trump and his supporters.

It's just like waste, and it's something that's been discarded by a lot of people.

As a result, my prison sentence was 10 years, 2 months and 7 days.

I was sentenced to 10 years in a correctional facility.

Branded as worthless and inhumane

Interestingly enough, the letters I received while in prison helped me out of the guilt, the gloom and guilt associated with the worst moments of my youth.

I learned the value of my existence

The sender is a 13 year old girl

called me a hero

It's an unforgettable memory, and I remember the word "hero" brought tears to my eyes.

More than 50 students, including this girl, participated in the correspondence education program, and I wrote 150 letters. The friend who organized the program with me was a middle school teacher in my hometown of Brooklyn.

We named it Young Scholars Program.

Every time my children tell me about themselves and tell me about their worries in a letter addressed to me, Every time they draw a picture of their favorite anime character and send it to me, Every time they tell me that they trust my reply and advice, My feelings of self-importance grow stronger.

I was taught my role on earth

my life changed

The letters they sent me and the youthful stories they told me gave me forgiveness and gave me the courage to admit myself. Not to make excuses for my sins, but to admit that there was a reason for that fateful October 1999 day. I made that choice for a reason, it was a terrible choice, but there was a reason for it.

The letters I received from my students were very important to me. Communicating with my students through the exchange of letters had a huge impact on my life.

Bill, Cory, and Ehrlock were fellow prisoners who, like me, gave their students advice, and they taught them their worth.

We've published books, we've become youth program facilitators, we've become trauma counselors, we've become gun violence prevention activists, we've become TED speakers -- (Laughter) -- we've been good fathers.

I would say the positive impact of that program.

And there's another thing that I've learned from what that program is trying to do, and that wherever you are, if you make the effort to create opportunities and bring out your humanity, you'll get great results.

There's been a lot of talk lately about overhauling the criminal justice system, but I've always wondered, why do so many people think that only non-violent drug offenders should be treated as human criminals?

Justice system overhaul is for human equality

Am I not human?

If you put people and money into the effort to expand your existence, you could create the ideal community in Lavantil, in parts of Brooklyn, or even in your own ghetto.

we can grow more

We can grow more than if we put people and money into law enforcement alone. Law enforcement doesn't teach us about our worth.

Gun violence is just the visualization of a lot of trauma.

Trying to find your worth with the intent to atone for your sins creates a sense of personal duty and heals emotional wounds.

I'm interested in these efforts because they involve humans.

Ladies and gentlemen, please strongly protect the people in your community. Considerable effort is required.Efforts to embrace with great kindness and affect those who are ignored, discarded, and treated like garbage.

I'm telling myself

Over the last two months, two of my friends have been gunned down just by being at the scene.

One was shot at by a moving car on the way home.

The other was attacked while eating breakfast at a cafe in Miami while on vacation.

I tell myself to find redemption for the criminal who killed my friend, because I had a hard time finding it too.

I want to take action as much as possible and overcome hardships so that I can feel who I am. Even people who are easily overlooked need to understand the life they've been through.

thank you

(applause)

(Singing) Hand out water Boy (Guitar sound) Where are you hiding?

(Guitar sounds) If you don't come here soon I'll tell your father

(Guitar sound) On this mountain (Guitar sound) There's nothing like this hammer (Guitar sound) Nothing resounds like this hammer (Guitar sound)

(Guitar sound) I'm going to break this rock (Guitar sound) The sound will reach Macon

(Guitar sound) You can hear it inside the prison (Guitar sound) Yes, inside the prison

(Guitar sound) You stole the diamonds (Music) You stole the diamonds I've known you for a long time, I've known you for a long time

You stole from me You stole from me You stole gold and silver Yes you stole gold and silver

Water boy, where are you hiding?

If you don't come here soon, I'll tell your father

There's nothing on this mountain like this hammer Nothing sounds like this hammer

I'm gonna smash this rock and the sound will reach Macon

You should be able to hear it inside the prison, yeah, inside the prison

Hand out water Boy (Guitar sound) Where are you hiding?

(Guitar sounds) You gotta be here soon You gotta be here soon You gotta be here soon I'll tell your dad

(Guitar sounds) (Applause) Thank you.

This song is based on various work songs, arranged by Odetta, a singer I admire.

The next song is, well, I've done a lot of songs with a history, starting with a band called the Carolina Chocolate Drops and even my own solo career.

As a musician, I think it's very important to know the history of your country, it's important as a person, as a country, as a people.

So I read a lot about the history of music and the history of countries.

I did a lot of research on the Civil War and slavery.

very spicy

what's so hard

it's hard to read

As an artist, the way to deal with those feelings is not just to read people's stories and say, "Slavery sucks."

It's terrible, but-

Read individual stories to find out how they felt.

that way

I think, "I might have been in that position."

There are things that are still relevant today

I have to make use of those feelings somehow.

I'm an artist, so I write songs

I read people's stories and wrote a song called "Come Love Come."

I'm going to play

(Applause) (Singing) My love, come on, the road is waiting Even though the road is long and hard

Come my love, the way is open, waiting for you in Tennessee

(music) (singing) At the age of four, my beloved mother was forced into the boss's men.

When my mother turned around, she was beaten and buried in the cold earth.

My love, come on, the road is waiting, yeah, the road is long and hard

Come my love, the way is open, waiting for you in Tennessee

(music) When I was 12 my dear father was strong and fearless until he raised his hand Sold me to Alabama

Come my beloved, the road is waiting patiently Even if the road is long and hard

Come my love, the way is open, waiting for you in Tennessee

(music) When I was 16, I fell in love, found the man I loved, and we ran away

We vowed to be together for the rest of our lives and got married on Saturday night

My love, come on, the road is waiting, yeah, the road is long and hard

Come my love, the way is open, waiting for you in Tennessee

(music) When I was eighteen, the army trumpets sounded, and the army in blue uniforms came over the wall.

On this occasion I chased for freedom The army brought me to Tennessee

My love, come on, the road is waiting, yeah, the road is long and hard

Come my love, the way is open, waiting for you in Tennessee

(music) Now I'm sitting in a little hut with thirteen people.

I sent you a letter All I can do is wait, wait, wait, keep on waiting for you

My love, come on, the road is waiting, yeah, the road is long and hard

Come my love, the way is open, waiting for you in Tennessee

My love, come on, the road is waiting, yeah, the road is long and hard

Come my love, the way is open, waiting for you in Tennessee

ohhhhhhhh

oh waiting for you

waiting for you

waiting for you waiting for you

(Applause) Thank you.

Now, dark stories need bright stories.

For hundreds of years, efforts have been made in the African-American community to lighten the mood.

I'm going to leave you with a few songs by Sister Rosetta Tharpe, an important figure in American music that many of you have never heard.

I would be very happy if anyone knew

He was one of the pioneers of the rock and roll guitar and one of the first musicians to transition from gospel to secular music.

She's a very important person, and I try to tell her story every chance I get.

I play some of her songs

Don't worry, you can sing along

(music) (singing) Look at your feet before you walk down the lonely road

Look up and say hello to God Gabriel blowing his trumpet

Even if I carry a heavy burden, let's go down that lonely road

Look at the lonely road beneath your feet before you take a step further

Look at your feet, before you walk down the lonely road

Look up and say hello to God Gabriel blowing his trumpet

Even if I carry a heavy burden, let's go down that lonely road

Look at your feet, look at your feet, look down the lonely road before you walk beyond it

From the sky From the sky I hear the music I hear the music

From the sky From the sky I hear the music I hear the music

Up in the sky Up in the sky I hear the music I hear the music I really believe I really believe there's a heaven somewhere

From the sky From the sky I hear a song I hear a song

From the sky From the sky I hear a song I hear a song

Up in the sky Up in the sky I hear a song I hear a song I really believe I really believe there's a heaven somewhere

(MC) Say hello to the guitar!

(Guitar music) This is Hubby Jenkins.

(Singing) From the sky I hear a loud voice From the sky I hear a loud voice

From the sky From the sky I hear a loud voice I hear a loud voice

Up in the sky Up in the sky I hear a loud voice Yeah, I really do, I really do believe there's a heaven somewhere

(MC) Then the bass this time

(bass solo) Yay!

Fu!

bass jason cypher

Jamie Dick on drums

Well we're running out of time

Now it's your turn to sing

It's call and response

answer me when i say

There are many songs like this, you know?

can you sing

can you sing

(Audience) Yes!

(Rhiannon) So come on!

(Singing) From the sky (Audience) From the sky (Rhiannon) I hear the music (Audience) I hear the music

(Rhiannon) From the sky (Audience) From the sky (Rhiannon) I hear the music (Audience) I hear the music (Rhiannon) From the sky (Audience) From the sky (Rhiannon) I hear the music (Audience) I hear the music (Rhiannon) With all my heart I truly believe that there is heaven somewhere

One more time!

From the sky (Audience) From the sky (Rhiannon) I hear music (Audience) I hear music

(Rhiannon) From the sky (Audience) From the sky (Rhiannon) I hear music (Audience) I hear music

(Rhiannon) From the sky (Audience) From the sky (Rhiannon) I'm hearing the music (Rhiannon) I'm hearing the music (Rhiannon) With all my heart I really believe that there's a heaven somewhere

With all my heart, yes, with all my heart, I believe there's a heaven somewhere

somewhere there's heaven

(extending last note) (applause and cheers) (end of music) (applause)

First of all, I would like to thank you from the bottom of my heart for the opportunity to speak at TEDxGateway in India on the subject of superheroes.

It's a pity that I can't actually go on stage, but this kind of form is also good.

I have learned a few things over the years that I would like to pass on to any Indian artist or writer who wants to write a superhero or a superhero adventure story.

I've been very conscious of India lately, because I'm working with my good friends Shraddhevarjan and Graphic India on the Mumbai superhero "Chakra the Invincible."

The goal in this work is very simple.

It was about bringing Eastern concepts like "chakra" into the Western world of superheroes.

I believe that superheroes always capture the imagination of people all over the world, regardless of their background, because people are always looking for something that embodies their ideal person or their ideal scene.

We all loved fairy tales when we were little.

Try to remember the giants, the witches, the wizards, the monsters, all the surreal and vivid things.

But when you get a little older, you stop reading fairy tales because they're too childish.

But my love for these types of stories doesn't go away as I grow up.

If you think about it, superhero stories are fairy tales for adults.

The characters that appear are as surreal as a fairy tale

They have fairy tale superhuman abilities: they can fly, they have superhuman strength, they can be invisible.

It allows viewers and readers to relive the excitement they felt as a child.

Now that I'm an adult, watching and reading superhero stuff is like reading adult fairy tales, which is why I love superheroes.

I've always valued the human side of heroes the most.

What I'm trying to say is that even if a superhero is super strong, or can fly, or run as fast as a comet, unless the reader is interested in the hero's personal life, there's no depth to the story they're reading.

Even people with superhuman abilities can have personal problems like you and I have.

You don't have money, you have problems at home, or the person you're in love with doesn't respond to your wishes.

Like a reluctance to associate with superheroes.

There are really a lot of different things that you can think of that will flesh out your personality and character so that you don't get stuck in a two-dimensional existence.

I want a three-dimensional hero, someone who lives and breathes like me and you, who has the same worries and the same experiences as you, with the only difference being that they have superhuman abilities.

One thing that bothers me -- and unfortunately -- is that most writers try to write something that the intended audience will like.

I can't do it, because I don't know what other people think.

I only know what I like, and that's why all the stories I've written have been written so that I could enjoy them myself when I read them.

I can't know what other people think, but I do know what I think, and I don't think I'm that weird of a person, so if you like one type of story, there must be a lot of people who like the same type of story.

That's why I've always written to entertain myself, not to entertain the intended reader, because you can't know more about your reader than you know yourself.

And if you're writing a story that's fun to write, and you can't wait to see what happens next, then I'm sure there's a lot of people out there in the world who would enjoy it as well.

In short, I've always written to please myself, not others, and somehow I think it worked because I'm not that different from other people.

So my final piece of advice is to let your imagination run wild and don't be afraid to come up with the wildest and wildest ideas.

If your work is truly unique, vivid, and well written, people will enjoy it.

Well, what does "well-written" mean? Even the person who comes up with the most interesting concept in the world, let's say, let's say, the story of a man who can fly faster than the speed of light comes to mind.

It might be interesting, but you have to give it credibility, which means you have to give your readers and viewers some reason to believe that you really have that ability.

This is how I acquired that ability.

The source of superhuman abilities is of great interest to everyone.

If it's something that's plausible as a source of power -- like Spider-Man was bitten by a radioactively contaminated spider -- it gives the viewer some reason to say, "Yeah, it's a plausible story, let's have some fun."

So even if your work is more like a fairy tale for grown-ups, try to include some facts and be detailed enough so that readers and viewers can say, "Yes, it could have happened."

But if the story is too wacky, it can go too far without giving a reason why it's so wacky.

What I'm trying to say is, let your imagination run wild, but make sure your story is based on factual evidence, so that your readers and viewers will embrace it and enjoy it as much as you enjoy writing it.

Good luck!

Thank you for listening I really enjoyed talking to you

Excelsior! (Going higher)

Imagine miniaturizing your smartphone and attaching it directly to your brain.

If you wear such a brain-implanted chip, you can get data to and from the internet at the speed of thought.

Access to social media and Wikipedia, like access to our memories, may come from within our thoughts.

It should be as easy and natural as thinking

But does it make it easier to know the truth?

Just because we can access information faster doesn't mean it's more reliable, of course, and it doesn't mean that we all interpret things the same way.

And it's not about getting better at evaluating things.

In practice, it might be worse, because the more data, the shorter the evaluation time.

Things like this are already happening to us

We carry the information world around in our pockets, but I can tell you that the more information we share and the more we access online, the harder it is to discern what's true and what's false.

We have more knowledge, but less understanding.

I think it's a feature of modern life, where many citizens live in an isolated information bubble.

We citizens are polarized — not only in our values, but also in our perception of facts.

One of the reasons is that the data analytics that are driving the Internet aren't just giving us more information, they're giving us more information that we want.

Our online life is personalized, from the ads we see to the news we receive on Facebook, tailored to satisfy our preferences.

While we get a lot of information, much of that information is as much a reflection of ourselves as it is a reflection of reality.

In the end, instead of bursting the bubble, it will only inflate our bubble.

It may not come as a surprise, but we find ourselves in a sort of paradoxical situation where we think we're accumulating more and more knowledge, but we don't agree on what we know.

How do we solve this problem of knowledge polarization?

One obvious tactic is technology refurbishment, redesigning digital platforms to make them less susceptible to polarization.

I'm happy to announce that some of the brightest minds at Google and Facebook are working on exactly this.

those projects are important

I think technology refurbishment is obviously very important, but technology refurbishment alone will not solve the problem of knowledge polarization.

The reason I think so is because, after all, it's not about the technology.

I think it's a human issue, and it's a question of how we think and what we value.

we need help to solve this

We're going to need help from psychology and political science.

On the other hand, you'll also need some philosophical support.

To solve the problem of knowledge polarization, we'll have to revisit one of the basic ideas of one philosophy: that we live in a common reality.

The idea of ​​a common reality, like many philosophical concepts, is easy to put into words, but strangely very difficult to put into practice.

I think there are three things we need to do to embrace that idea, and all of them are challenges at this point.

First, you need to believe the truth

As you may have noticed, there is currently a conflict between our culture and our notion of truth.

There is so much disagreement between us that it seems as if, as one political commentator recently put it, "facts no longer exist."

But this way of thinking is, in a way, just a fascinating speculation.

The argument goes something like this: "We can't go outside our own perspectives, we can't escape our biases.

Every time you try to escape, you just get more information based on your perspective."

And he continues, "So we should accept that objective truth is an illusion, it doesn't matter, because we don't know what it is, or there is no such thing as truth."

This is by no means a new philosophical way of thinking, but a skepticism of truth.

As you may know, it was an idea that was very prevalent in several schools at the end of the 20th century.

But this is an idea that goes all the way back to the ancient Greek philosopher Protagoras.

"Objective truth is an illusion," he said, because of the idea that "man is the measure of all things."

man is the measure of all things

This seems to people to be a pragmatic policy, or liberating, because it allows us to discover and create the truth individually.

But really, it seems like self-justification in the name of philosophy.

Because you confuse the difficulty of being certain with the impossibility of truth.

Look, it's not easy to be certain about anything -- maybe we're all living in a world called The Matrix.

We may have chips implanted in our brains that feed a ton of false information.

But in reality we clearly agree on a number of facts.

I agree that bullets can kill people.

I agree that people can't fly by flapping their hands.

Agree, and we should agree, that there are realities out there, and ignoring them can cause injury.

However, skepticism of truth can also be seductive because it tends to justify our inherent biases.

But if you justify your bias, you'll end up looking like someone in the movie "The Matrix," who knows he lives in the matrix and dares to like it.

I get what I want because it feels good

It feels good to be "always right"

A lot of the time, it's easier for us to shut ourselves up in our cozy information bubble and live dishonestly, and we take that bubble as a measure of reality.

I think the way we react to the social phenomenon of fake news is an example of how dishonesty affects our behavior.

The fake news that spread online during the 2016 US presidential election was designed to play into our biases and inflate our bubbles.

What really struck me about fake news wasn't just the fact that it fooled so many people.

What really caught my eye about the social phenomenon of fake news is that fake news itself has become the subject of knowledge polarization, and as a result, the word "fake news" -- the word itself -- means "news that I don't like."

This is an example of the disloyalty to the truth I'm talking about.

But I think the real danger of skepticism of truth is that it leads to tyranny.

"Man is the measure of all things" necessarily becomes "The person is the measure of all things"

So that "everyone can do it" becomes "only the strong survive"

At the end of Orwell's novel 1984, O'Brien, a thought policeman, tortures the main character, Winston Smith, and tries to brainwash him into thinking that 2+2=5.

The line O'Brien tried to persuade Smith to get to the heart of the matter: "Everything the Party says is true, and truth is what the Party says."

O'Brien knows that accepting this idea makes it impossible to criticize the system.

By definition, if power tells the truth, then you can't tell the truth to power.

To accept that we live in a common reality, we must do three things.

The first is to believe in truth.

The second boils down to the Latin phrase that Kant took up as the motto of the Enlightenment: "Sapere aude" — "Be bold to know."

Or what Kant expected, "the courage to know for yourself."

In the early days of the Internet, many of us thought that information technology would make it easier for us to know ourselves, and of course, in many ways, it did.

But as the Internet permeates our lives, our dependence on it and how we use it are becoming increasingly passive.

A lot of what we know now comes from the "Google way of understanding."

Download a set of pre-made facts and rearrange them on the assembly line of social media.

The Google way of understanding is useful because it's like intellectual outsourcing.

We let other people's networks and algorithms do the work we should do.

That, of course, keeps us from being overwhelmed by a wide variety of facts.

You can download when you need

this is amazing

But downloading a set of facts isn't the same thing as understanding the reasons and context behind the facts.

You can't just download and understand why a particular disease is prevalent, or why a certain mathematical proof holds, or why your friend is depressed.

That's when you need to do the work yourself, to have creative insight, to use your imagination, to go out into the field, to experiment, to prove it, to talk to someone else, and so on.

I'm not saying that you should avoid the Google way of understanding.

What I'm saying is don't overestimate

We need to find ways to help us understand more proactively and without relying too much on the bubble.

Because a lot of times the Google way of thinking ends up with the bubble way of thinking.

And the bubble way of thinking is always right for me.

But the quest to know -- the quest to understand -- risks the possibility that you'll make a mistake.

There is a danger that what you want to know is different from the truth.

Knowing this danger leads to the third thing we need to do if we want to live in a common reality.

Third, have a little humility.

Humility here refers to epistemological humility, in a sense, the recognition that we don't know everything.

But humility doesn't stop there.

It's about seeing your worldview as one that can be improved based on the evidence and experience of others.

See it as something that can be improved based on the evidence and experience of others.

It means more than being flexible to change.

means more than being positive about self-improvement

Humility is seeing your knowledge as something that can be enhanced and enriched by the contributions of others.

You are responsible for that too — part of engaging in recognizing that there is a common reality.

I don't mean to exaggerate, but our society is not particularly good at promoting or promoting that kind of humility.

Part of the reason is that we tend to confuse arrogance with confidence.

Another reason, as you know, is that it's easy to be arrogant.

that you know everything

It's easier to think that you've solved everything

This is yet another example of the disloyalty to truth I'm talking about.

The notion that there is a common reality, like many philosophical concepts, can seem so obvious that it's easy to overlook it and forget why it's important.

Democracy can't work if citizens don't make an effort to live in common ground, at least sometimes.

But if we don't accept that we all live in the same reality, we can't make an effort to live in a common place.

To accept it, believe in the truth and spread a more active way of acquiring knowledge.

We must have the humility to recognize that humans are not the measure of all things.

Maybe one day we'll have the internet in our brains -- that kind of vision will come true.

If we want it to be liberating rather than terrifying, and if we want it to be more understanding than passive knowledge, there's something to keep in mind.

thank you

(applause)

Imagine walking into this room tonight and seeing that everyone around you looked pretty much the same.

The person sitting next to me might be someone with a very weird personality, but I have no idea, because they're all so stereotypically deadpan.

This is the uncanny change that's happening in cities right now, it's just that it's not people, it's buildings.

Cities are full of bumps, shadows, textures and colors.

In some places, you can still see the exterior of buildings with distinct personalities and features: apartments in Riga, apartments in Yemen, public housing in Vienna, Hopi villages in Arizona, brownstones in New York, wooden houses in San Francisco.

These are not palaces and churches

It's just an ordinary house, but it embodies the natural beauty of a city.

The reason for this is that the desire for housing is closely tied to the human desire for beauty.

We can touch the city thanks to the bumps on the outside.

For example, you can feel the city by running your finger along the blocks and stones.

But it's getting harder because cities are getting empty.

The skyscrapers that are burgeoning in new downtowns are usually all made of concrete and steel and covered with glass.

Look up at the skies in cities around the world, Houston, Guangzhou, Frankfurt—every horizon is lined with an army of glistening, robot-like buildings.

We have a wide variety of materials available, but think about what we'd lose if architects stopped using them.

If you lose granite, limestone, sandstone, wood, copper, terracotta, brick, wattle, plaster, buildings become monotonous and cities lose their richness.

It's like taking all the food in the world and putting it all together and making it an in-flight meal.

(laughs) Chicken or pasta?

But to make matters worse, the concentration of glass skyscrapers, like here in Moscow, also undermines the civic and communal aspects of city life.

These buildings are designed to serve their owners and their occupants, without necessarily thinking about the lives of the rest of us, the people who pass between them.

no one is going to pay

Shiny skyscrapers are an invasive species that are suffocating our cities and killing public spaces.

We tend to think of the façade of a building as a kind of makeup, a decoration added to an already completed building.

But just because the facade is superficial doesn't mean it doesn't have depth.

Let me give you an example of how the appearance of a city affects the lives of those who live there.

When I visited Salamanca, Spain, I was drawn to Plaza Mayor, all day long.

In the early morning, the sun's rays on the façade cast sharp shadows, and at night, the light of the lamps divides the building into hundreds of different compartments: balconies, windows, arcades, each with a different look.

With its detailed and profound beauty, the square becomes like a theater.

It becomes a stage where generations of people can come together.

Some young people lie on the paving stones, some old people occupy the benches, and real life looks like an opera set.

Salamanca is the opening

I'm not talking about form or function or structure because I'm focusing on the facades of buildings right now, but nonetheless, these facades add color to our lives, because they create spaces around them, and those spaces draw people in and push people out.

In many cases, it's the quality of the building exterior that makes the difference.

A modern version of Salamanca's Place de Mayor is Paris's La Défense district, a glass-enclosed, windswept open space where office workers scurry past the metro station to work, but no one bothers to spend time there.

In the early 1980s, architect Philip Johnson set out to recreate an elegant, European-style plaza in Pittsburgh.

This is PPG Place, 2,000 square meters of space surrounded by commercial buildings made of reflective glass.

These buildings are decorated with metal rims and partitions, and their dozens of Gothic turrets stand out against the sky.

But when you stand on the ground, the square looks like a black glass cage.

Of course, in the summer, children run through the fountains, and in the winter, there's a skating rink.

Anyway, it's not a place where you just want to gather and talk.

The success or failure of public spaces depends on many factors.

Architecture is just one of them, but it's an important factor.

In terms of modern squares, Melbourne's Federation Square and Copenhagen's Superkielen are successful because they combine old with new, rugged with smooth, neutral with vibrant, and don't rely too heavily on glass.

But that doesn't mean I'm against glass.

Glass is an ancient versatile material.

Easy to manufacture and transport, easy to install and replace, and clean

It can be any shape, from a giant, highly transparent plate to a translucent block.

With a new coating, you can change the atmosphere depending on the amount of light.

In expensive cities like New York City, glass has magical powers, and by creating views, it can multiply the value of real estate.

With the construction of the Crystal Palace in London in the mid-19th century, glass rose to the top of the quintessential modern materials.

By the mid-20th century, glass began to take over the streets of several American cities, in large part due to the creation of spectacular office buildings, such as SOM's Lever House in Midtown Manhattan.

Advances in technology have allowed architects to design structures so transparent that they blend in with their surroundings.

In the process, glass has become the norm in high-rise cities, and for good reasons.

As the world's population concentrates in cities, the underprivileged flock to cheap, low-income neighborhoods.

But if you want to build the gigantic buildings where hundreds of millions of people live in apartments and work, it makes sense to build skyscrapers and cover them with cheap and practical curtain walls.

But glass has limits to its expressive power.

This is part of the wall surrounding the square in the ancient city of Mitla in southern Mexico.

A number of 2,000-year-old carvings make it clear that this was a place of great ceremonial importance.

Even today, there is a sense of continuity in history and texture. You can see the continuity between the sculptures and the mountains that surround them, and the church built of stone looted from the ruins that sits on top of the ruins.

In nearby Oaxaca, even ordinary plaster buildings become canvases, adorned with bright colors, political murals and intricate graphic art.

These fine, communicative languages ​​will be wiped out by the spread of glass.

The good news is that architects and developers are starting to enjoy the texture of materials again, and without retreating from modernity.

Some people have found innovative uses for old materials like blocks and terracotta.

Others have created new things, such as the molded panels that Snohetta Architects used to give the San Francisco Museum of Modern Art a rippling, sculptural look.

Architect Stefano Boeri even created a living façade.

Here's the piece, a pair of skyscrapers in Milan called the Bosco Verticale (Vertical Forest), where green is the most prominent feature.

Boeri is designing something similar for Nanjing, China.

If green façades were as prevalent as glass buildings, how much cleaner would the air be in Chinese cities?

But the reality is that these are mostly one-off, small specialty projects that can't be easily replicated on a global scale.

But that's the point

With local materials, no city looks the same.

New York City has a long association with copper. Copper was used for the top of the Woolworth Building, the Statue of Liberty, and was long obsolete.

It's not finished yet, but it's still lit by the setting sun, and this is what the metallic façade looks like, and it's going to take on a bluish tint as it ages.

buildings are like people

"Face" shows the experience up to that point

And that's also the point, because when the glass gets old, you can just replace it, and the building will look pretty much the same forever, and it will stay that way until it's destroyed.

Almost any material other than glass can take history and memories of the past and project them into the present.

Architectural firm Ennead encased the Utah Museum of Natural History in Salt Lake City in copper and zinc, the metals mined in the area 150 years ago that camouflaged the building into the ocher hills, thus creating a natural history museum that reflected the region's natural history.

When Chinese Pritzker laureate Wang Shu built a history museum in Ningbo, he didn't just create an enveloping past, he embedded memories into the walls, using blocks, stones and roof shingles salvaged from abandoned villages.

Now, architects can use glass in equally poetic and creative ways.

The two buildings here in New York, the Jean Nouvel building and the Frank Gehry building, face each other across West 19th Street, and the movement of the light between the two buildings is like a symphony of light.

But as cities grow, when glass becomes the norm, it becomes a hall of mirrors, unsettling and cold.

After all, cities are places of concentrated diversity, where cultures, languages ​​and lifestyles from all over the world converge and mingle.

Rather than trapping all that variegated diversity in a terribly monotonous cluster of buildings, we need architecture that celebrates the broader urban experience.

thank you

(applause)

Pay close attention to something It's not that easy, is it?

Because our attention is pulled in many different directions at the same time, and it's much better to be able to stay focused all the time.

A lot of people think of paying attention as focusing on something, but it's also about what information your brain blocks out.

There are two types of attention

One is explicit attention

In explicit attention, when you pay attention to something, you also direct your gaze to that object.

and the other is the latent attention

Implicit attention focuses attention on something, but does not move the eye.

Consider driving a car, for example.

Your explicit attention, your eyes, are looking forward, but your implicit attention is constantly checking the space around you, even though you're not really looking.

As a computational neuroscientist, I'm working on brain-machine interfaces in the field of cognition, connecting the brain and the computer.

i love brain patterns

And that's important to us, because we can take that brain pattern and build a computer model, and then use that model to get a computer picture of how the brain works.

If the brain isn't functioning properly, the computer can be used as a therapeutic adjunct.

But there's another side to it: choosing the wrong pattern can lead to the wrong model and the wrong treatment.

Right?

In the case of attention, not only eye movement, but thought can change the focus of attention, and that fact makes implicit attention an interesting subject to model in computers.

So I wanted to know what the brain wave patterns are when people pay attention, both implicitly and explicitly.

So I prepared an experiment like this

The experiment uses two blinking squares, one blinking slower than the other.

Depending on which square you focus your attention on, certain parts of your brain will begin to respond in sync with the rate of blinking.

So by analyzing the signals your brain sends out, you can figure out where you're actually looking, where you're paying attention.

To see how the brain behaves during explicit attention, we asked the subjects to fixate their eyes on one square and direct their attention to it.

In this case, of course, we could see the blinking squares in the signal coming from the back of the brain, which is responsible for processing visual information.

But what's really interesting is the case of subconscious attention.

Now, we asked the subjects to stare at the center of the screen and keep their eyes still on one of the squares.

At this point, we could see both blink rates in the brain signals, but what's interesting is that the one that was paying attention emitted a stronger signal over time.

The frontal part of the brain is responsible for higher cognitive functions in humans.

The frontal cortex acts like a filter, taking in information from the blinks of the person who pays attention to it, and blocking information from the person who ignores it.

This filtering function of the brain is key to attention, but some people lack this function, such as with ADHD.

People with ADHD can't block out distractions, and they can't focus on one task for long periods of time.

But even so, what if you could connect your brain to a computer, play a dedicated computer game, and train your brain to shut out distractions?

ADHD is just one example

This brain-machine interface in cognition can also be used in other areas of cognition.

A few years ago, my grandfather had a stroke and was completely unable to speak.

I could understand everything people said, but I had no way of reacting to it, even writing, because I was illiterate to begin with.

grandfather died in silence

I remember thinking at the time, I wish I had a computer that could speak for my grandfather.

Years later, I got involved in this field and wondered if it was possible.

Imagine if we could identify what happens to the brainwaves when someone imagines an image or a letter.

Maybe one day computers will be able to convey the thoughts of people who can't speak?

What if a computer could understand the thoughts of a person in a coma?

It's still a long way off, but please keep an eye on it.

you'll get there soon enough

thank you

(applause)

This is a picture of me happy in 1999.

It was my senior year in college, right after dance practice.

i was really happy

I remember exactly where I was 10 days later.

I was in the backseat of my second-hand minivan in the university parking lot, thinking about committing suicide.

As soon as I decided to do it, I devised a solid execution plan.

I went right to the very edge of the cliff

When I was closest to death

It was only by a few lucky coincidences that I took my finger off the trigger.

It was this accidental element that later frightened me the most.

So I began to systematically try different strategies to manage my ups and downs, and I would say that it was a good investment.

I have bipolar depression and so does my family.

I've been depressed more than 50 times in my life, and I've learned a lot.

I've written a lot in the many times I've been at bat, in the darkness of the ring, for rounds.

So instead of telling you about the secrets of success and all the glorious moments, I thought I'd tell you how to avoid self-destruction and paralysis.

The tools that I've found to be the most reliable safety nets against emotional descents are also the tools that have helped me the most in making business decisions.

it is secondary

That tool is the store philosophy.

sounds boring

(Laughter) You might think of Mr. Spock, or you might think of this image. (Laughter) A cow in the rain.

I'm not sad, I'm not particularly happy

They're expressionless creatures who just accept what life gives them.

You wouldn't have thought of the ultimate fighter like Bill Belichick, head coach of the New England Patriots and NFL Super Bowl record holder.

In the last few years, the Stoic philosophy has spread like wildfire among top NFL players as a way to build mental toughness.

You wouldn't have thought of the Founding Fathers, Jefferson, Adams, Washington, but they were also Stoics.

Washington puts on a Stoic play, "The Tragedy of Cato," at Valley Forge to boost the morale of his soldiers.

So why do people who act like that look at ancient philosophies?

It looks academic

I encourage you to look at the Stoic philosophy a little differently, as a guide to navigating stressful environments and making better decisions.

It all started with a pouch like this

In Athens around 300 B.C., a man named Zenon of Cition was giving a lecture while walking around a "store," a painted porch.

which later came to be called the Stoics.

Greco-Roman people used Stoic philosophy as a general system for doing things.

The key part of that, for our purposes, is training us to distinguish between what we can control and what we can't, and focus on the former.

It can be very powerful in suppressing emotional reactions.

Conversely, for example, if you're the quarterback,

If you fail a pass and get mad at yourself

you lose the game itself

If you're a CEO and you're a very important employee, and you make a small mistake and lose yourself, you could lose an employee.

I'm a college student and I'm feeling depressed and hopeless, and if it doesn't stop, I could die.

So what's at stake here is huge.

There are many tools you can use to do that.

Let's take a look at the things that completely changed my life in 2004.

Two things led me to this: a very close friend suddenly died of pancreatic cancer at a young age, and then the girlfriend I was planning on marrying left me.

I gave up and left this amount instead of a farewell letter.

(Laughter) It's not a hoax. I still have it.

"Working hours end at 5 o'clock."

She gave me this to put on my desk and take care of myself, because at the time I was so busy with my first business.

I didn't even know what I was doing, working 14+ hours a day, 7 days a week.

I was also taking stimulants for that purpose.

And when I fell asleep, I took a depressant

it's messed up

completely immobilized

I bought a book about being simple in search of answers

And I found a quote that would change my life forever: "We suffer more in our imagination than in reality," said the famous Stoic philosopher Seneca the Younger.

So I started reading his letters, and I learned a training method, premeditatio malorum, which means to contemplate evil in advance.

Simply put, it's about envisioning in detail the worst-case scenarios that you fear and that keep you from acting, so that you can overcome your paralysis and take action.

My problem is monkey mind, very noisy and constant.

Trying to think through the problem doesn't work

I had to put my thoughts on paper

So I came up with the idea of ​​a paper exercise called "Clarification of Fear," rather than clarification of goals.

consists of 3 pages

it's very simple

The first page looks like this

Write "What if?"

Pick up whatever you're afraid of, something that makes you anxious, something that you're running away from.

Ask someone out on a date End a relationship Seek a promotion Quit a job Start a company

can be anything

In my case, it meant taking my first vacation in four years, leaving my business for a month, going to London, staying with a friend for free, and either removing myself as a business bottleneck or closing the company.

The first column is "Definition," where you write down all the worst things you can imagine that would happen if you took that action.

about 10 to 20

I won't list them all, but I'll give you two examples.

The first is that if you go to London, it's raining all the time and you're feeling down and you're just wasting your time.

The second is that you overlooked a notice from the IRS and your company goes bankrupt due to audits and investigations.

The next column is "precautions"

In this column, write what you can do to prevent something like that from happening, or at least make it less likely.

As for being depressed in London, I would bring a portable blue light and have 15 minutes of exposure every morning.

I know this helps prevent bouts of depression.

If you're an IRS, you can change your registered address so that IRS papers go to your accountant instead of your home.

That's easy

The last column is "Recovery"

Write down what you can do and who you can call for help in the worst-case scenario to repair even a small amount of damage.

If you're depressed in the first London, you can find the money and fly to Spain to soak up the sun and pick yourself up from the blockage.

If you miss a notice from the IRS, call a friend who is a lawyer or a law professor and ask them what to do, who to talk to, and how they've all dealt with it in the past.

As you're working on this first page, the question to keep in mind is, "Has anyone in the past, less intelligent or less motivated, ever done this?"

the answer is probably yes

(Laughter) The second page is also simple: "What are the benefits of this attempt or partial success?"

You can see that I exaggerate my fears and greatly underestimate the good.

When you actually try to do what you're thinking about, what do you expect to gain in confidence, in skill acquisition, in emotional or financial?

What are the possible benefits of a single hit?

Export in 10-15 minutes

Page 3 is probably the most important

Do not omit "the cost of not doing"

People are very good at thinking about what could go wrong when they try something new, like asking for a raise.

What we don't often think about is the cost of maintaining the status quo and not changing anything.

So the question you have to ask yourself is, what would my life be like if I avoided this behavior or decision, six months from now, 12 months from now, maybe three years from now.

Beyond that, it starts to get vague.

It's important to think in detail, to anticipate the emotional, financial and physical aspects.

When I did this, a scary image came to my mind.

I'm self-medicating and if I don't leave the company could collapse at any moment

Relationships were full of conflicts and failures.

I realized that there was no choice for me not to act.

It's all in these three pages.

By doing this, I found that, on a scale of 1 to 10, where 1 is the lowest and 10 is the highest, taking this trip has a risk of temporary, reversible pain, from levels 1 to 3, and a life-changing, semi-permanent, positive effect from levels 8 to 10.

so i went on a trip

no disaster happened

I had a little problem

I was able to free myself from the company

I ended up extending that trip to a year and a half round-the-world trip, which was the basis for my first book and why I'm here now.

I attribute all of my great successes and all of my major disasters that have been avoided to the clarification of fear that I do at least once every quarter.

this is not a panacea

Some fears are justified

(Laughter) But we shouldn't jump to conclusions without doing a lot of research.

It doesn't make difficult times or difficult choices easier, but it does make them a lot easier to swallow.

Finally, I would like to introduce my favorite modern Stoic philosopher.

This man is Jersey Gregorek

Four-time Olympic weightlifting champion, 62-year-old political exile and poet.

Even now, I'm no match, and most of the people here are no match.

absolutely amazing person

I spent a lot of time in his store — on the porch, getting advice on life and training.

He was a member of the Polish Solidarity, a nonviolent movement for social reform, that was violently suppressed by the government.

he lost his job as a firefighter

The teacher, the priest, was kidnapped, tortured, killed and dumped in the river.

he was also threatened

My wife and I had to flee Poland, scattered around the world, and ended up in America with just the clothes we wore.

He now lives in a very nice place in Woodside, California. Of the 10,000-plus people I've met, he's in the top 10 in terms of success and happiness.

This is the key, so listen carefully

A few weeks ago, I texted him and asked, "Have you ever read about Stoic philosophy?"

And he sent me a two-page message back.

This is rare, and he's a very reserved person.

(Laughter) Not only did he know the Stoic philosophy very well, but he used it to make some of the most important decisions in his life, to stand up for his principles and his ethics at turning points in his life.

Two things were written at the end

First, I can't imagine a life as beautiful as that of a Stoic.

And there was this guiding principle that he applies to everything, and that's something you can use, too: "Easy choices lead to hard lives.

Hard choices make life easy."

Hard choices — often what we fear most to do, hear or say is exactly what needs to be done

And the great challenges and problems that we face are not something that we can solve in comfortable conversations, whether in our heads or with other people.

I encourage you to ask yourself: Is clarifying my fears more important to me now than clarifying my goals?

Always remember Seneca's words, "We suffer more in imagination than in reality."

thank you very much

(applause)

I will now give four specific examples. And finally, how the company Silk tripled its sales, how an unknown artist named Jeff Koons became a millionaire and became an influence, and how Frank Gehry redefined what it meant to be an architect.

And I would like to talk about what was the biggest mistake I made as a marketer at a record company that put out a CD called Sauce.

But before that, let me tell you about sliced ​​bread and a guy named Otto Rohwedder.

What did people say before sliced ​​bread was invented in the 1910s?

This is the second invention of the century after the telegraph... or what?

By the way, sliced ​​bread was invented by a man named Otto Rohwedder. And like other inventors, he looked to patents and manufacturing processes.

All I can say about the invention of sliced ​​bread is that in the 15 years since it was invented, no one bought it, no one knew about it, and it was a total failure.

Because nobody wanted it until Wonder brand bread came along and figured out how to spread the idea of ​​sliced ​​bread.

The success of this loaf of bread, like almost every success story told here, is not about what the patents are or what the factory is about, it's about being able to spread the idea.

To get what you want and make the change you want, you have to figure out how to spread your ideas.

It doesn't matter if you run a coffee shop, you're an intellectual, you run a business, you fly a balloon. I think it applies to everyone, no matter what they do.

We live in a century of diffusion of ideas.

Whatever the idea is, the person who spreads it wins.

When I speak on this subject, I often refer to business. This is partly because the presentation should look good, and partly because it is easy to compare the superiority and inferiority numerically.

Forgive me for sticking to business, but this theme applies to anything you invest in your time.

At the core of idea diffusion is television, or something similar to television.

In some ways, television and the mass media have made it very easy to spread ideas.

I named it "TV-Industrial Complex".

The structure of the television-industrial complex begins with advertising. Then, it gets into people's lives and acquires a sales network.

The more sales networks you have, the more products you can sell.

Use your increased profits to hit more promotions.

And the process repeats itself. Just like the military-industrial complex once worked.

In a model like the one we heard yesterday, if we could somehow just land on the Google home page, if we could just somehow figure out how to promote there, if we could just somehow figure out how to grab someone by the neck, and if we could tell them what we wanted to say.

If you can do that, you will get attention and you will be successful.

This television-industrial conglomerate was probably my main source of information during my childhood and perhaps yours.

The reason all these products are successful is because someone found a way to get into your consciousness without your knowledge. It's not necessarily how people like it. Repeat and repeat until you buy the product It's a way to advertise.

And what is happening now is that there is no longer a TV-industrial complex.

Over the past few years, anyone who has tried to market something has realized that the old way of doing things doesn't work.

This photo is very blurry, sorry. I had a bad cold when I took this photo.

The blue box in the middle of the shelf is a bad example I often refer to.

I have a cold and am going to the store. I need to buy medicine.

That blue box brand manager spent a hundred million dollars trying to get my attention for a year.

That's why they spent $100 million on TV commercials, magazine ads, spam, coupons, shelf placements, and special bounties. In the end I just ignore all messages.

Yes, I ignore it. Because I don't have a medical condition that would require painkillers.

I just buy the medicine in the yellow box as usual.

I will not waste even one minute of my precious time for that brand manager. Because it doesn't matter.

This is a magazine called Hydrate. There are 180 pages just about water.

(Laughs) That's amazing. Articles about water and advertisements about water.

Imagine what the world was like 40 years ago, when there was only The Saturday Evening Post, Time and Newsweek.

There are even magazines about water now.

New product from Coca-Cola Japan. water salad.

(laughs) Coca-Cola Japan releases new products every three weeks. Because you never know what will or won't hit.

By the way, this came out 4 days ago. I couldn't have written more.

I've circled the important points so you can see them.

Arbys is spending $85 million to promote the potholder character.

Voiced by Tom Arnold. I hope everyone will see it and go to Arby's and buy a roast beef sandwich.

(Laughter) I can't imagine who would see an animated TV commercial with the voice of Tom Arnold and go out of their way to get in the car and go to town and buy a roast beef sandwich.

(Laughter) This is Copernicus. he was right If you want to share your idea with someone

The world tends to revolve around you. Me, me, me, me, my favorite person is -- me.

I don't want email, I want ME email.

(Laughter) For the consumer, it's not just the people who shop at Safeway or the like, but it's also someone in the Department of Defense who needs to buy something, or someone who works for The New Yorker who might publish your story.

Consumers don't care about you. I am not interested at all.

One reason is that consumers have far more choices and far less time than ever before.

In a world with too many choices and too little time, it's easy for people to ignore them.

As an analogy, you're driving a car and you find a cow, but you keep driving because you've seen cows many times.

Cows are blind, cows are boring.

Who would stop a car and say, "Oh! Look! It's a cow!" There is no such person.

(Laughter) But if the cow was purple -- it would have been cool to see this special.

let's do it again

If the cow is purple, you should notice.

If all the cows were purple, I think it would be boring again.

A factor that determines what goes viral, what is done and changed, what is bought and what is built is whether it is remarkable.

The word “remarkable” is a very cool word. Not only does it mean that it is cool, but it also means that it has value that makes you want to tell someone (remark it).

This is the essence of where idea diffusion is headed.

The two most popular cars in America are the giant $55,000 car and the Mini Cooper small enough to fit in the trunk of that car.

People pay full price for both, but what these two cars have in common is that they have nothing in common.

(laughs) The number one selling DVD in America changes every week.

It's not "The Godfather" or "Citizen Kane." It's always a third-rate movie with a second-rate star.

The reason why it became No. 1 is because it was released that week.

Because it's new and fresh.

People look at it and say, "I didn't know there was such a thing." and spread.

In the last 20 years, two of the most successful things in retail have been either putting goods in blue boxes and selling them very high or making them as cheap as possible and selling them cheap.

The only thing they have in common is that they are completely different.

Now about fashion, no matter what we do for a living, we are in fashion.

People in the fashion industry know what the industry is like and are used to it.

Others have to learn how to think like them.

Instead of interrupting someone with big page-wide ads and insisting on meeting people,

It's an entirely different process for an idea to spread and not spread.

This Aeron chair sold for a billion dollars. It has become possible by redefining what it means to sell a chair.

I changed my perception of chairs to be something that represents one's status at work, rather than something that is bought by some purchasing department.

This man, Lionel Poirane, is the most famous baker on earth. He passed away two and a half months ago. He was a great man and a dear friend to me.

He lives in Paris and sold $10 million worth of French bread last year.

Every loaf was baked one by one in a wood-fired oven.

When Lionel started his bakery, the French were making fun of him.

They didn't want to buy it because it didn't look like French bread.

It wasn't what everyone expected.

But it was great and it stood out. So one by one, it spread. And finally, it has become a purveyor to several 3-star restaurants in Paris.

And now his company is in London and ships bread all over the world with FedEx.

Once upon a time, all marketers did was build average products for average people.

That's what mass marketing is.

Remove the edges and focus on the center.

Central is the big market. I was ignoring eccentrics, and people who weren't lively were out of my sight as a matter of course.

It was all about how to focus on the center.

But now that the TV-industrial complex has crumbled, this marketing strategy is no longer valid.

These people are so good at ignoring -- instead of targeting

Instead, we need to focus on these people. Because there is a lot of interest.

Because they are people who are enthusiastic about something.

And if you speak to them, they will listen. Because they love to hear because it is about themselves.

If you're lucky, your friends on the other part of the curve -- they'll tell you. And it spreads steadily. It will spread out over the entire curve.

They are called "Otaku". This is a very nice Japanese word.

This word means a person with a maniacal desire. For example, driving around Tokyo and going to a new ramen shop. They act like this because they are particular about it.

If you build a product, sell an idea, or come up with a problem you want to solve, if you don't have the support of geeks, you're unlikely to succeed.

On the contrary, you have to find a group that really listens to what you have to say.

And to make it easier for them to tell their friends.

There are spicy sauce geeks, but there are no mustard geeks.

So while there are many types of dry sauce, there are not many types of mustard.

It's not because it's hard to make good mustard. You can make good mustard, but nobody makes it. Because there are no mustard enthusiasts anywhere. So I don't even tell my friends about it. Krispy Kreme has realized this.

Their strategy is to go to town and talk to otaku. Then they spread it all over town. Even to someone who crossed the street. This yo-yo costs $112, but it will hold you for 12 minutes.

Not everyone wants this, but I don't mind that.

It may spread by interacting with people who are interested.

These guys make the loudest car stereos in the world.

(Laughter) This is as loud as a 747 jet. I can't get it in my car.

The windows must be bulletproof or they will blow you away.

But really, if someone wants to put a speaker in their car and has a sense of geek or knows someone who is a speaker geek, they will choose this speaker.

It's very simple. Sell ​​to people who are interested, and maybe these people will tell their friends.

So when Steve Jobs gave a presentation to 50,000 people, people in 130 countries watched his commercial for two hours. That's what keeps his business going. These 50,000 people enthusiastically watched his two-hour commercial and told their friends.

Pearl Jam has put out 96 albums in the last two years.

All of which were profitable. how?

They only sell through their website.

People who buy this album on the website are geeks. Then tell your friends, spread it, and spread it further.

A crib in this hospital costs $10,000. 10 times more than normal.

But hospitals prefer this over other models.

A hard candy manicure isn't for everyone. But the person I love talks a lot.

This paint right here saved a paint company called Dutch Boy. It was 35% more expensive than regular paint, but it made a big profit.

That's because Dutch Boy made an outrageous container.

Instead of just throwing in a new ad, it changed what it meant to make a paint product.

Amlhotornot.com is a site visited by 250,000 people daily. It is run by two volunteers. And to be honest, they're very picky... (Laughter) It's not that they were successful because they did a lot of advertising.

Succeeded by standing out. A little too noticeable at times.

This photo frame has a code on the back. Tie this to the wall.

My father keeps this on his desk. Every day, the photos of my grandchildren are replaced and displayed there.

Anyone who walks into his office will be told about this photo frame.

And one by one, this spreads.

These are not real diamonds.

It's made out of bones.

After being cremated, you become a jewel yourself.

(Laughs) Oh, you like my ring, right? this is grandma

(Laughter) It's the fastest growing business in the funeral market.

It doesn't have to be Ozzy Osbourne. You don't have to be crazy to do this.

You just have to understand what people want and give it to them.

Let's summarize some rules.

Number one. The design is free if you can scale it.

People who come up with things worth noting usually come up with designs that work well.

Second. The most dangerous thing is to choose safety.

Do you know Procter & Gamble?

Procter & Gamble's model has always been average products for average people.

It's risky. Now it's safe to cut corners --

Stand out.

Being very good is one of the worst things.

Because excellence is boring. Because excellence is normal.

It doesn't matter if you're making music albums, or you're an architect, or you're doing sociology.

If it is very good, it will not succeed. Because no one will notice

Next, three stories of my own confidence.

silk. I put something that didn't even need to be in the refrigerated section -- next to the milk in the fridge.

Sales have tripled. why?

Milk, milk, milk, milk, milk -- no milk.

That's what stood out to people watching that section.

We didn't triple our sales with advertising. I did something that stood out and tripled my sales.

This is a very remarkable work of art. You don't have to like it.

But a big, 40-foot dog made of grass in the middle of New York City gets attention.

Frank Gehry didn't just change museums. He changed the economy of an entire city. By designing buildings that people from all over the world come to see.

Now, at countless meetings, the Portland City Council said it needed an architect. I was wondering if I could call Frank Gehry.

Because he did something on the edge.

And my big mistake? I tried to sell -- (music) music albums, hopefully a lot -- in a great format, the SACD format. I marketed it to people with $20,000 stereos.

But people with $20,000 stereos don't like new music.

(Laughter) The point is to know who is most interested.

Who raises their hand and says, "I want to know what you're going to do next"? and sell them something.

One last example. This is a map of Soap Lake in Washington state.

As you can see, if there is a place where there is nothing, this place is it.

(Laughter) But there is a lake.

People used to come from far away to swim in this lake.

No one comes anymore. So said the founder. "I have money to spend --

what should i make here? and like many other committees

They were trying to make something very safe.

An artist came there. This is the work of a true artist. He wanted a 55 foot lava light right in the middle of town.

That's the purple cow. It's worth noting.

I don't know about you, but if it was made I would definitely go there.

Thank you for your attention.

Welcome to the first slide, please.

Bees fly, dolphins swim, and geckos can climb any smooth wall.

of the wondrous world that I study

I would like to introduce just a few of them here.

The purpose of learning to design nature -- I'll talk about how and what it's used for later --

So the question to ask is, what is it that gives an animal such great athleticism that it allows it to move around so freely?

How can we apply it? about it

From a biological point of view, this ability is a really cool, genius thing that living things have perfected over millions of years.

Then why not just copy the natural creatures as they are?

But if you look at animals, you'll find that copying isn't the answer, because "stopping when enough" is the principle of evolution, not perfection.

I also learned that nature's creation of living organisms is severely constrained. Nature is a technology under tremendous constraints.

If you're an engineer and you're told to build a car, but start small like this, and then take steps to grow into something bigger.

Even if such a car is made, if you are told to build a factory that makes new cars inside it,

(Laughter) You can't do something like this from scratch without any foundation.

Organisms have their base

Evolution is less of an engineer than a craftsman of small improvements.

This is important when looking at living organisms.

We need to take cues from biology, not copies.

We figure out the basic principles of the natural world, and if they're useful, we use them.

It's a very difficult job because the way living things work is so complicated It's a very difficult job because the way living things work is very complicated

Joint movements and muscles are also very complex.

Even simple organisms like insects have incredibly complex neural circuits.

How do you make sense of something like this? So I hypothesized that what makes animal movement possible is that the control of movement is built into the body itself.

And we found that when two-legged, four-legged, six-legged, eight-legged animals all move, the forces acting on the ground are the same.

jump like this kangaroo

I call it that because it can be modeled in terms of a spring-mass system, but in a nutshell, it's like a hopping toy.

It's like jumping on a spring-loaded stick.

A human's one leg works the same as a dog's two legs combined, an insect's three legs and a crab's four legs.

These legs alternately provide propulsion, and the pattern is the same in most of the animals we've studied. In fact, in a paper due out next week, I'm going to write that giant animals like Tyrannosaurus rex were incapable of this kind of locomotion.

So we discovered vertical jumping in animals, when we were working on a project at Pixar and we were talking about the bipedal ants in "A Bug's Life."

Of course there is also horizontal movement,

Why do we only model vertical motion when we know there is horizontal motion? I was asked this is a good question

Because no one in the biological world had yet built a model like this.

As you pointed out, we also modeled the animal's movement in the horizontal direction by combining the three legs into one.

With the help of eminent mathematicians at Princeton University

I was able to create a model of an animal that bounces not only up and down, but also left and right at the same time.

This pattern is seen in many organisms

The reason I'm paying attention to this is

And the reason is, interestingly enough, this model is able to restore balance without the brain or the reflexes -- just the structure of the body -- if you try to push it, like if you've hit an object.

That's a great model, so let's look at the formulas.

(laughs) Let's stop! (smile)

Let's stop! (Laughter) When animals run, they seem to use springy legs for balance.

Why have these discoveries gone unnoticed until now?

Human and natural technology are very different Human and natural technology are very different

Consider a typical robot

Human technology is usually bulky, flat, angular, made of hard metal, travels on wheels, and has a limited number of motors and sensors.

Nature, on the other hand, is rather delicate, curvaceous, flexible, has legs, has a great many muscles and sensors.

It's a completely different design, but as I'm going to show you, these days, human technology is becoming more like nature's, so we should be able to learn more from nature.

here is an interesting example

It's a joint research with Stanford University.

It uses the shape deposition manufacturing technology developed by the university.

You can combine different materials to create any shape and embed the properties of the material.

Now we can incorporate sensors and actuators into the shape itself.

For example, in this leg, the transparent part is hard and the white part is flexible, so there's no shaft.

bends just right

We applied these properties to create a robot called Sprawl We applied these properties to make a robot called Sprawl.

This inspired the University of Michigan and McGill University, which inspired the University of Michigan and McGill University to build an autonomous six-legged robot, RHex.

In this video, I'm going to show you how animals move and robots that apply our research.

I'm sure some of you did something similar this morning.

this is how the research looks

(Laughter) It's a skull in the United States. It's not in your kitchen. It's a skull in the United States. It's not in your kitchen.

The 8-legged scorpion, the 6-legged ant, and the 44-legged centipede are

They all move like hopping They all move like hopping This ghost crab does the same.

I'm running at 4 meters per second

Legs off the ground, like a horse running Legs off the ground, like a horse running

What we found was that the relative stiffness of the leg springs was the same in all animals, whether it was humans, cockroaches, crabs, or kangaroos.

What is the significance of the leg springs?

I set out to find out if this would help with the stability and mobility of the animals.

So we set up an obstacle that was three times higher than the target animal's waist. So we set up an obstacle that was three times higher than the target animal's waist.

I thought this would be impossible

I got over it and my speed didn't drop at all!

I got over it and my speed didn't drop at all!

I didn't think it was possible, but what we're going to see is that with simple leg springs, we can make robots that are more mobile than ever before.

The first example was made by Stanford University using shape deposition technology.

This robot, called Sprawl, has six adjustable elastic legs.

It moves like an insect, and what's important about it compared to other robots is that it can't see, it doesn't feel, it has no brain, it can't see, it doesn't feel, it has no brain, and it can easily climb over obstacles.

This is the technology that incorporates properties into the shape.

This graduate student is doing terrible things with his thesis project, but he's very solid, very solid.

(Laughter) This is the first test run of RHex built by McGill University and the University of Michigan.

(Laughter) It's just six motors that move, but with tuned elastic legs, it walks like an insect.

The middle leg moves in tandem with the front and opposite hind legs, sort of like a tripod with alternating legs, and it can climb over obstacles just like an animal.

(Laughter) (Voice: Amazing) (Applause) This foot is unfinished, but it's OK in the sand. This foot is unfinished, but it's OK in the sand.

RHex walking into the woods

(Laughter) This robot doesn't see or feel. It doesn't have a brain.

(Voice: oh nice) We're down the road.

When I showed this to NASA's Jet Propulsion Laboratory, they told me that robots with legs would be too complicated to look for ice or life on Mars.

So I simplified the RHex again and showed this video. So I simplified the RHex again and showed this video. I colored the video orange to give it the feeling of being on Mars, so that it could be used for the 2011 Mars Expedition.

(Laughter) (Applause) Another reason why animals have amazing abilities and are able to move around is the use of interaction with the environment.

There's one here. It's firmly attached.

here is the quiz watch the video

One looks like it's running on a flat surface, but the other is running up a wall. Can you tell which is which?

It's running at 1m/s Who thinks the left side is climbing the wall? It's running at 1m/s Who thinks the left side is climbing the wall?

(Applause) It's totally indistinguishable, isn't it?

It climbs the wall at 1 meter per second and takes 15 steps per second.

It's an amazing ability, by the way, the gecko on the right is climbing the wall.

And the way it works is that the gecko's toes have been modified so that they grow straight, like a blowback at a party, and they peel off the surface like tape.

Removes like a tape from the surface

It's strange that you can do that with your toes, isn't it?

One with legs and a bulldozer version of a tractor.

Watch the video of the gecko in action Watch the robot in action After watching the video of the gecko in action Watch the robot in action

It's a gecko running up a vertical plane.

You can't use a normal camera, you can't see it unless it's at 1000 frames per second

You can't use a normal camera, you can't see it unless it's at 1000 frames per second

This is a picture of 1000 frames per second

Look at the back of this gecko

Can you see it bending? I don't understand why this is possible. Can you see the bend? i don't know why this is possible

If your sons come to my lab, they'll figure that out, too. I recommend you study at Berkeley. This is a gecko treadmill.

This is a gecko treadmill, and because both the machine and the belt are transparent, you can observe and videotape your feet from the other side of the belt.

This gecko is running up a vertical wall

Look at your toes and see what the gecko is doing.

I stretch my toes and peel them off

It took 0.014 seconds, which is amazing.

iRobot's Mekko Gecko

First, watch how the gecko's toes come off.

And this is Mekko Gecko

It uses a pressure sensitive adhesive

Gecko and Mekko gecko This allows it to autonomously climb surfaces such as walls and ceilings This allows it to autonomously climb surfaces such as walls and ceilings

It's a bulldozer, and the animals don't use pressure-sensitive adhesives.

gecko is not using this

But this is the current limit

What do geckos do

There are many small folds on the toes, and if you zoom in, you can see fine lines in the folds.If you zoom in, you can see fine lines in the folds.

At 270x magnification, it looks like a carpet.

At 900x, you can see fine hairs.At 900x, you can see fine hairs.If you look closely, there are streaks in the hairs.If you zoom in further at 30,000x, you can see split ends.

If you zoom in further, the split ends look like a spatula.

If you zoom in further, the split ends look like a spatula. Geckos have a billion of these nano-sized split ends that they can attach to surfaces. This is the only diameter of a human hair.

imagine this sticking

Luckily, researchers at Stanford University created a special sensor that could measure the force of a single hair.

This is a single hair with split ends

When I measured the force of this hair, it turned out to be very strong.

With just that much hair, a gecko's foot can easily support the weight of a small child -- about 20 kilograms. How does that work?

This has recently been clarified. Could it be friction?

No, the force is too weak, but is it static electricity?

No, even if you change the electric charge, they are still stuck together.

Will they tangle like Velcro?

No, then you can't stick it on a smooth surface

Is it like a suction cup? Adheres even in a vacuum environment

Is it the interfacial tension that makes wet objects stick together?

Even though they don't secrete glue, geckos stick together underwater.

Even though they don't secrete glue, geckos stick together underwater.

So what is this sticking force? What an intermolecular force, the Van der Waals force.

You know, you used to do this in chemistry class, when two atoms come together -- you used to do this in chemistry class, when you put two atoms together -- there's a small force due to the distribution of electrons that accumulates until it's adsorbed, and that's what's happening in this tiny structure.

I'm working with my colleagues at Berkeley to develop this hair-based product.

Very recently, there has been a breakthrough in research that could lead to the development of the first synthetic self-cleaning, drying adhesive, and many companies are interested.

(Laughter) We pitched to Nike.

(Laughter) (Applause) I'm really excited about what's going to happen, because in the nano-scale world, everything has an attraction force that overcomes gravity.

I'm going to figure out how an ant can move around without problems, and I'm going to make it move.

Where is this research going?

The Internet already has eyes and ears, like webcams, but in the future, it will probably have hands and feet.

You could give these robots instructions and they could do things, they could run, they could swim, they could fly, and David Kelly's fish robot is a good example.

I have a message at the end

Nature is important in and of itself, but to address search and rescue, demining, health care, and many other problems, we must protect nature's design, otherwise the secret is lost forever.

Thank you. (Applause)

Thank you. (Applause)

The best Christmas for my kids was the worst Christmas for me and my husband.

Elizabeth is 7 and her little brother Ian is 5 I can't imagine how you can get whatever you want for Christmas

The children didn't realize that the reason Santa was so generous was because my husband and I knew something.

We had just learned a terrible truth and were terrified.

It was 1994, and a series of events had been going on for several years.

I've known for several years that Elizabeth had a rash on the side of her neck that looked like heat rash.

At the same time, my father and brother died of cancer, so I'm sure I was worried about the disease.

The doctor proudly said, "There's nothing wrong with you, so don't worry," but I wasn't sure.

I took Elizabeth to a dermatologist, even though it was self-funded without a referral.

I'm sure it's an allergy, but why do I only have a rash on both sides of my neck?

And then, two days before Christmas in 1994, the dermatologist took a quick look at Elizabeth's neck and said, "You have pseudoxanthoma elasticoma."

Then I turned off the lights and examined my eyes.

As it happens, the dermatologist was also trained as an ophthalmologist.

was lucky

I felt nauseous

Yellow "tumor"?

Tumor means melanoma, lymphoma... cancer.

Why is this doctor examining your eyes when you have a rash?

i was screaming in my heart

So

Elizabeth had pseudoxanthoma elastico, PXE for short.

Frightened questions erupted like bile.

"Why are you examining my eyes?"

"What do you know about this?" "How can you be so certain?"

"What is the prognosis?"

Despite my training in nun counseling, I wasn't prepared for this.

Berkovich told me everything he knew about PXE.

"It's a rare genetic disease." "It's a systemic disease." "It's a slow, premature aging disease."

"Saggy wrinkles on the skin in the flexor area."

“It will make you visually impaired, just like age-related macular degeneration.” “It will cause cardiovascular problems.”

“There is still little knowledge, and according to reports at that time, some people die in their 30s.”

Then the dermatologist took a quick look at my son and said, "So does this kid."

I want to go back to the old days

Two days after Christmas, a researcher from a university in Boston came and took blood from us and our children for a research project focused on finding the causative gene.

A few days later, researchers came from a medical center in New York, and they also wanted to draw blood.

"These children

5 and 7 years old

Please don't prick me twice."

"Get another researcher to share your blood."

as they say it's hard to believe

"Sharing?"

In that moment, I understood that there is no sharing in medical research.

That's exactly when my husband and I made up our minds.

We went to a medical school library and copied every paper we could find on PXE.

I didn't understand it at all

I bought medical dictionaries and science textbooks and read everything I could get my hands on.

I still didn't understand it, but I did get the gist of it, and within a month it was clear that no systematic effort had been made to understand PXE.

On top of that, as we've experienced, monopolies were rampant.

Researchers were competing with each other, because the medical research system was built to reward competition, not to alleviate patient suffering.

We realized that we had to deal with this situation ourselves to find solutions for ourselves and others like us.

But there were two huge walls standing in our way.

The first is that neither my husband nor I have a scientific background.

At the time, my husband was a manager at a construction company, and I had quit being a college nun to become a stay-at-home mom.

The second barrier is that researchers don't share.

Everyone told me it was impossible to follow a pack of cats.

You can do it if you flick the bait

(Laughter) (Applause) DNA and clinical data is bait.

We collected blood and family history, and we asked the researchers, "You can use this research material, but please share the results with each other and with your donors."

Long before the Internet, my husband and I founded PXE International, a non-profit organization that designs and promotes research on PXE, as well as providing support to individual patients.

We used traditional media to solicit donations of blood, tissues, medical histories, medical records from 100 to 150 patients from around the world.

put them all together

I quickly realized that just sharing research materials wasn't enough.

I decided to do a serious scientific experiment, a serious study.

We rented lab space at Harvard University.

A very kind neighbor came to sit on the kids two or three times a week from 8:00 p.m. to 2:00 a.m., and during that time my husband and I extracted the DNA and electrophoresed it for the causative gene.

A kind postdoc kindly guided me through the experiment.

Within a few years, we discovered the disease-causing gene.

We obtained a patent so that anyone can use it freely.

We also created a diagnostic kit

We also held a research consortium

We also held study groups and set up core research bases.

We've identified over 4,000 PXE patients around the world, held patient conferences, conducted clinical trials and medical research.

All the while living in fear

The fear of sickness was always around

There's also the fear of researchers, people who have made their careers and established themselves in a world made for researchers.

Fear of making the wrong choice

There was also the fear that the naysayers were right and the cats would just find new food.

But all that fear was outweighed by my desire to make things better for my children and the people I met.

I soon realized that the work for this one kind of disease should be done for all kinds of diseases.

I joined and later became the leader of the Genetic Alliance, a network that connects medical advocacy, patient advocacy, research and medical institutions.

We have created a scalable and scalable system for all diseases, including biobanks, registration systems, and support guides.

As I learned more about these diseases and their disease communities, I realized two medical secrets that had a big impact on me.

The first is that there is no one-size-fits-all answer, whether it's a common condition or a rare condition for my children and the people I work with.

Second, the answer is that we all have data, we provide biological samples, and ultimately we provide ourselves.

There are individuals working to change this.

Citizen scientists, activists, technologists have changed this system by crowdsourcing hand-made science.

Even President Obama and Vice President Biden have endorsed the idea that people should join hands in research.

This is why I created this organization

Of course, finding and developing medical procedures and treatments was difficult.

It's scientifically advanced, and it's legally cumbersome.

There are many stakeholders who are very interested, but the motivation is not monolithic: publication, promotion, tenure.

I don't want to condemn scientists with that goal, but I appeal to them and to ourselves to choose a different approach.

to remind them that the patient is the center

The Genetic Alliance has been trying to change this entrenched system.

The goal is an activity that transcends occupations

This sounds abstract, but it's real to us.

When laboratories complain about not sharing their data, because that data is derived from patients' energy, time, blood, and sometimes tears, they have to interrupt and ask, "Why can't we share when we actually can?"

we are part of that system

How can we share ideas freely?

Can we take risks and get along with each other?

This eased the "us versus them" conflict, not just as an organization, but as individuals.

If I demand that organizations and individuals make an effort to make this the norm, then I, too, need to explore who I am and how I live.

When I ask doctors, researchers, and administration to take risks, I have to take risks as well.

I have to face my personal fears

Fear of not having enough influence

Fear of not leading well

fear of inadequacy

As soon as the children turned 10, they cut the tide, saying, "Stop worrying about making a difference and making an impact. Instead, learn to live with your disease, not fight it like we do."

The question I have to ask myself is where does my fear come from?

These children's remarks lit up the fear.

It's something that springs up from the depths of deep love

i love elizabeth and ian

People with PXE also love

I love people with any disease

i like humans

A colleague discovered that this is not the fear of death, but the sheer magnitude of love.

This expansive love exposes me to great distress in the face of loss.

When my fears became clear, I knew there was boundless love for me and everyone around me.

And then I realized that when I stepped into this fear, I learned a lot of new things, and found practical solutions and things that were at the heart of recovery and wellness.

I am no longer afraid of "fear" like I used to be

These days, thanks to a lot of help from my fellow activists, I no longer take fear as a warning the way I used to.

It was an invitation to move on, because there was love and it was leading to greater love.

When you peer into that fear, you find enormous wealth in yourself and in others, and find the strength to step into challenges you never thought possible.

My children are ahead of me on that path.

My children, who are now 29 and 27 years old, have clearly stated that they have PXE symptoms in their skin and eyes and arteries, but they are happy and healthy.

So I invite you and all of us to face fear, to embrace what scares us and to realize that love is at the heart of it.

Not only can we get ourselves back, but we also know where we stand on what scares us and what scares us.

When we listen to that fear and expose ourselves as vulnerable to the systems and people who oppose us, our power as challengers increases exponentially.

When you realize that working inward is working out, and that outward activity is inward activity, you reach and achieve what is true.

(Laughter) There's no limit to what we can achieve together.

thank you

(applause)

My seven-year-old grandson sleeps in the room across the hall, and when he wakes up in the morning, he often says, "Today is the best day ever."

Other times, in the middle of the night, my voice suddenly trembles and I ask, "Will Grandma get sick and die too?"

This applies to me and many people I know, and we are all mixed grills of happy anticipation and anxiety.

So just a few days before my 61st birthday, I decided to make a list of things I know for sure.

There are so few truths in popular culture that it's good to have a few things to be sure of.

For example, I'm no longer 47, although I feel like I'm 47, and I like to think I'm 47.

My friend Paul, in his late 70s, used to say that he felt like a young man with something wrong with him.

(Laughter) The real part of who we are is outside of time and space, but the records show that we were born in 1954.

My inner self is outside of space-time

no age

Like all of you, I'm at every age I've been through. As an aside, I have to say that I wish I hadn't followed the rules of skin care in the '60s.

(Laughter) But it felt so liberating to face the fact that I was past my midlife crisis, so I decided to write down all the truths I knew.

People feel hopeless and overwhelmed these days, and they keep asking me what the truth is.

I hope that my list of mostly positive things can serve as a basic guide for those of you who are feeling overwhelmed and overwhelmed.

The first and most true is that all truths are paradoxes.

Life is a precious and immeasurable gift, and at the same time life is unbearable when it comes to incarnation.

It's a pretty bad combination for someone who was born with a very high degree of sensitivity.

It's so messy and weird that it makes me wonder if he's being fucked

At the same time, it's filled with poignant loveliness and beauty and hopeless poverty and floods and babies and acne and Mozart, all swirling together.

It's hardly an ideal system.

(Laughter) Two: "Almost anything, if you unplug it for a while, it will start working again — (Laughter) (Applause) Even humans."

Three: "There is almost no lasting help other than yourself — unless you're waiting for an organ transplant."

You can't buy it, you can't master it, you can't associate with it

This is the most terrible truth and it makes me very angry.

But this is the work of the heart, and we cannot set the stage for peace and lasting improvement for the people we love most in the world.

You have to find your own way, your own answer

You can't go with your grown children on their Hero's Journey with sunscreen and lip balm.

have to let go

It's disrespectful not to

Besides, if it's someone else's problem, I don't have the answer anyway.

(Laughter) Our help doesn't help much.

This help can be harmful

And help is good control of the body.

stop helping so much

Don't spread your help and kindness to anyone.

(Laughter) (Applause) This is related to number four, "Everybody's screwed up, broken down, dependent, and scared -- even the most calm-looking people."

Other people are more like you than you think. Don't try to compare what you're inside to what someone else is on the outside.

'Cause it's only going to get worse

(Laughter) No one can help, fix, save, or sober up.

Thirty years ago, it was the breakdown of my behavior and my thinking that helped me quit drinking.

I sought help from the severed and turned to the power of higher beings.

One of the acronyms for GOD is Gift Of Desperation, and friends who helped him said it ended up getting worse faster than he could lower his standards.

(Laughter) In this case, GOD might mean "I've run out of good ideas."

While trying to fix, help, and save is futile, intense self-care is like a breath of fresh air that radiates from within you into the atmosphere.

It's a great gift to the world.

When people respond by saying, "Isn't she overconfident," put on a vague Mona Lisa smile and serve yourself and the other person a delicious cup of tea.

Home is a place where you can be filled with love for your stupid, selfish, strange and annoying self.

That's where world peace begins

5: 75% cocoa chocolate is not food

(Laughter) One of the best uses for it is bait in a snake trap or adjusting the length of a wobbly chair leg.

It's not meant to be eaten

Six — (Laughter) "Writing."

Every writer you know has a terrible first draft, but they keep sitting at their desks.

that's the secret of life

Maybe that's the big difference between you and the writer.

they write all the time

as a promise to myself

as if paying the bill

Tell a story a little bit each day as something that comes from within.

When my brother was in fourth grade, he had an end-of-term paper to write about birds, and it was due tomorrow, and he hadn't even started yet.

So my father sat down next to me and laid out a bird guide, a piece of paper, a pencil, and a cotter pin -- if you're a little younger, you might remember the cotter pin -- and he said to my brother, "Just do one bird at a time.

Read about the Pelican Write about the Pelican in your own words

Then research the black-capped chickadee and talk about it in your own words.

Then the geese are next."

So the two most important things about writing are taking it one by one and writing a terrible first draft.

If you don't know where to start, remember that every single thing that happens to you is yours and you can write about it.

If someone asks me to write better about myself, I'll get what I deserve

(Laughter) (Applause) If one day you wake up and you haven't written anything that touches your heartstrings, you'll feel awful.

That's what I have to offer everyone, and that's what I was born for.

Seven: Publishing and creative fads are the kind of thing that must be overcome.

Success kills as many people as failure.

It hurts, harms, and changes people in ways you can't even imagine.

The most vulgar and vicious people I know are the best-selling male authors.

But, back to point one, all truths are paradoxes, and it's a miracle to have your work published and your story read and heard.

Quietly break the illusion that just putting out a book will heal you — that it will fill the hole in you like Swiss cheese.

can't heal

does not heal

But writing heals

Singing in choirs and bluegrass bands

Whether it's painting a public wall in your community, bird watching or caring for an old dog without a home.

8 "Family"

Family is a very, very difficult thing, no matter how precious and amazing family is.

see number one again

(Laughter) Even if you suddenly feel murderous or suicidal at a family reunion -- (Laughter) in any case, remember that your family is a miracle for everyone, especially pregnancy and childbirth.

Earth is a school of forgiveness

Forgive yourself first, then at the dinner table.

That way, I can do it in comfortable trousers anyway.

(Laughter) When he said, "We're here to learn how to withstand the light of love," William Blake knew that family was an essential part of it, even if it made him want to run screaming for his dear little life.

But I assure you that you will be fine.

You can be Cinderella and you'll be amazed

Nine "Food"

let's do a little better

you should know what i mean

(Laughter) 10 — (Laughter) "God's grace."

God's grace is the soul's lubricant or swim bladder

The wonder of grace is that the love of God -- Kissinger, Putin, me -- as much as your newborn grandchildren.

what the hell

(Laughter) The work of God's grace transforms us, heals us, heals the world.

To summon grace, say "help me" and fasten your seatbelt.

Grace will find a place for you, but will not leave you where you came from.

Unfortunately, Grace doesn't look like the friendly ghost Casper.

But when your phone rings or you get an email, you'll find yourself regaining your sense of humor despite all the hardships.

Laughter is really like a sacred soda.

It helps us breathe again, it takes us back, it gives us faith in life and in each other.

Remember, grace is always the last hitter

11 “God Means Only Good”

it's nothing to be afraid of

Divine, loving, enlivening intelligence, or, as we learned from the great Ditheriorata, the cosmic muffin.

God's Good Name Is "What You Are Not"

Emerson said, "The happiest people on earth are those who learn God's teachings in nature."

So go out and look up

The pastor said that bees can be kept in jars without lids.

let's go outside and look up

is the secret of life

The last is "death"

number 12

In addition, hehe

Losing someone you can't live without is unbearable.

You'll never get over it, and no matter what the culture teaches, it's never going to get over it.

We Christians think of death like a change of address, but if you don't seal it up, the person starts living again in your mind.

As Leonard Cohen said, "Everything has cracks, and that's how light gets in."

That's how we feel our loved ones alive again.

Sometimes you're thinking about that person and you're laughing out loud, and it's just not the right time, but it's great news.

Yet his absence will bring a lifelong nightmare of homesickness.

Grief and friends Time and tears will heal to some extent

Tears wash away, baptize, freshen and moisten people and the earth they walk on.

Do you know what the first words God said to Moses?

"Take off your shoes."

Even if it doesn't look like it, it's because it's a holy place

It's hard to believe, but this is the most true thing I know.

When you're a little older like me, you realize that death is as sacred as birth.

don't worry just get on with your life

Almost every death is easy and easy, with just the right people by your side as much as you need.

don't be lonely

No matter what's waiting there, everyone will help you cross

As Ram Dass puts it, "In the end, everyone just goes home."

That's all, but let me know if you can think of anything else.

thank you

(Applause) Thank you very much.

(Applause) I was very surprised when I was invited, because technology, design and entertainment are not my domain.

My domain is little more than staggering along with faith and writing.

I was surprised, but I was happy to accept the offer to speak.

"If you don't know where to start, remember that every single thing that happens to you is yours and you can write about it."

In America these days, people are so scared that it feels like it's over.

If you act in a truly wholesome, loving and friendly way, you will get a feeling of loving and friendly behavior.

Imagine you walk into a room and you're in a control room full of people, with 100 people sitting at a control console with little dials, and that control room shapes the thoughts and feelings of a billion people.

It sounds like science fiction, but it's a true story right now.

I can say this because I was in that control room myself.

I was in charge of design ethics at Google, researching how we could ethically manipulate people's thoughts.

It doesn't say how the choices made by a handful of people working at a handful of tech companies can affect what a billion people think.

What happens when you pick up your phone and what you see is designed to occupy a certain amount of time in your consciousness.

When you see a notification, it makes you think about things you never thought you would.

When you swipe a notification, it sucks a minute of your time with something you never intended to do.

When we talk about technology, we talk about endless possibilities.

I can go in any direction

But if you look a little closer, you can see why technology moves in certain directions.

Evolution is not random

All of the technology we create has one hidden goal, and that goal is attention.

Every news site, every TED, every election, every politician, every game, every meditation app, there's one thing we have to acquire: our attention. Attention is so much.

If you want to get people's attention as much as possible, know how the human mind works.

There are many different types of manipulative technology, and I learned about attention-grabbing techniques in the Persuasive Technology lab at university.

A simple example is YouTube

YouTube tries to maximize your viewing time

so what to do

auto play the next video

if it works so well

YouTube gains a little more time

So what does Netflix think when they see it?

Then Facebook will lose more and more of its market share, so let's autoplay all the videos in your news feed without having to press play.

So the internet isn't evolving randomly.

It's this race for attention that makes us feel like we're being swallowed by the Internet today.

I can see the end

Technology isn't neutral. It's a race for the depths of the brainstem -- who can go the farthest.

Take Snapchat for example

In fact, Snapchat is the number one communication channel among American teens.

Teens communicate on Snapchat the way we communicate on messaging, and we have about 100 million users.

And then they came up with a feature called streaks, which tells you how many consecutive days two people have been interacting with each other.

In other words, this is how you created and gave something between the two of you that you didn't want to lose.

If you're a teenager and you have a record of 150 consecutive days, you don't want to lose it.

Taking a little time to do that is imprinted in your consciousness.

By way of example, not assumption, it turns out that during family vacations, people often give their passwords to as many as five people in an effort to maintain their streak when they can't interact with them.

I have like 30 streaks, so I also take pictures of walls and ceilings every day just to keep it going.

It bears no resemblance to a real conversation.

We adults think that Snapchat for young people is probably what we're talking about on the phone.

there should be no problem

But what's overlooked is that in the 1970s, when you were bashing on the phone, the 100 engineers behind your screen weren't trying to figure out how the human psyche works and then try to force them into each other.

If this story made you a little angry, notice how quickly that anger came.

Anger is also a very good way to get attention. Anger is not a choice.

is what arises

Whether Facebook wants it or not, anger is good for the news feed.

Not only can your anger response take over your time and space.

The anger that arises makes me want to tell others

Click "Share" and write "Can you believe this story?"

Anger is so effective at getting "attention" that if Facebook were to choose between an angry feed and a calm feed, it would be showing the angry feed not because someone deliberately chose it, but because it's more effective at getting attention.

We don't know what the newsfeed control room is doing.

Only getting maximum attention is considered

And because it's an advertising business model, if a customer who walks into the control room pays you a lot of money, you can ask them, "Please send this idea to that group."

You can target your lies to the most vulnerable people.

This is a for-profit business, so things get even worse.

I'm telling you this story today because it's clear what's being sacrificed.

I don't know of any problem more urgent than this. Behind every problem lies this problem.

Not only is it disrupting our agency in deciding what we pay attention to and what kind of life we ​​want, it's also altering the conversations between us, it's altering our democracies, it's altering our ability to talk to each other and build the relationships we want.

This affects everyone, because a billion people have a cell phone in their pocket.

How can we deal with this?

We need three fundamental changes in technology and society.

First of all, we need to recognize that we can be easily manipulated.

By understanding that we allow small thoughts in our minds and allot a little bit of time without our choosing, can we avoid this situation?

I think we need to look at ourselves in a completely different way.

It's like a whole new era in human history, similar to the Age of Enlightenment, but just an Age of Enlightenment about self-knowledge, where you realize that you can be manipulated and that you have something you want to protect.

Second, we need new models and systems of explanations. As the world becomes better and more manipulative -- and it will become more and more manipulative -- the people in the control room will be held accountable and transparent about what we want.

Manipulation is ethically permissible only when the manipulator and the manipulator have the same goal.

It's a point of contention that calls into question the major premises of the advertising business model.

And finally, design needs a renaissance. When we understand this human nature and how we're manipulating the timelines of a billion people, we're being pulled in the wrong direction by the intentions of people who have a desire for what they want people to do, what they want them to think, what they want them to feel, and how they want to be informed.

A billion people are being pulled in the wrong direction.

What if we aim to provide the timelines of a billion people with the right and most empowering use of their time through a fundamental renaissance of design?

It has to do two things. One, it protects you from things you don't want to experience, the things you don't want to think about.

Let me give you a concrete example

Let's say you feel a little lonely today because your dinner with a friend has been cancelled.

What do you do then?

Open Facebook

In that moment, the only thing the control room designer wants is to maximize the amount of time spent on that screen.

Now, what if, instead, designers could create alternate timelines -- which is easy with the data they hold -- to help you hang out with the people you care about?

Think about it, what if Facebook was trying to do something about social loneliness through Timeline?

Consider another example

You want to post something very controversial on Facebook, and it's very important to be able to do it and to be able to talk about controversial stuff.

I still have a big comment section, but it's as if it's asking, "What do you want to enter?"

In other words, it encourages the conversation to continue on screen.

What if instead there was a button that said, "How would you like to spend your time?"

When you click on "Hold a dinner party", below that you'll see

What if you clicked "Hold a dinner" and below that was "Who's coming to dinner?"

It's the same thing that allows you to have some controversial conversation, but it's set in the most empowering place in your life's timeline, which is, that night, a bunch of your friends get together at your house to talk about it.

What if we could do a "find and replace" across our current timeline and replace it with what we really want out of life, the timeline that's pushing us to spend more and more time in front of our screens?

The status quo should change

What if, instead of stifling our "attention," using all the data and all the power and new understandings of human nature, we could have superhuman focus, the superhuman ability to direct our attention to what we really care about, and the superhuman ability to have the conversations we need for democracy.

Individual attention alone is not enough to meet some of the world's most complex challenges.

Such challenges require our concerted attention.

Global warming will require a collective attention of many people in a way that works best for them.

Imagine creating a superhuman ability to make that possible.

Or maybe the world's most important and most pressing problems are not just hypothetical problems yet to come.

The most pressing problems are right under your nose, and they may already be shaping the thinking of a billion people.

We're going to fall in love with the new augmented reality, the virtual reality, and all the cool things that might come our way, and we're going to be swayed by the same competition for attention that we're having now.

What if, rather than being addicted to a new educational app that works brilliantly, what if we could change the situation where young people's minds are being manipulated into silly interactions?

(Applause) Instead of worrying about the possibility of future AI runaways in the pursuit of certain goals, why not solve the problems already created by AI runaways? A news feed optimized for one purpose is exactly that.

It's like repairing the planet we're in instead of abandoning the Earth and colonizing a new planet.

(Applause) Solving this problem is an essential foundation for solving all other problems.

There's nothing in your life or in a collective matter that doesn't require the ability to pay attention to what you care about.

Ultimately, life is all about attention and time.

What is the best use of that time

thank you

(Applause) (Chris Anderson) Thank you, Tristan, please stay a little longer.

first of all thank you

I asked you to do this talk last minute, so you must have had a rough week trying to put it all together.

Some would argue that the problem here is addiction, and that the gimmick is really interesting.

It's also interesting to see how design decisions lead to amazing and interesting user content.

the world has never been more interesting

what's the problem

(Tristan Harris) I think that's really interesting.

One way of looking at it is if you just think about YouTube, for example, you're always going to show the next more interesting video.

We'll keep getting better at suggesting the next video, but even if we can suggest the perfect next video that everyone wants to see, we're just going to be better at tying the user to the screen.

where is the limit

I want YouTube to think about sleep, for example.

Netflix's CEO recently said, "Facebook and YouTube and sleep are competitors."

Human beings have structural limitations, and there are certain limitations and aspects of life that should be cherished and respected, and technology can help with this.

(Applause) (Chris) Can you explain why it's also a problem that we're adopting a simplistic model of human nature?

Most of the problems can be dismissed as preferences, but when you have an algorithm that can adapt admirably to human preferences, what preferences do they fit?

Sometimes it's a preference about something you really care about, and sometimes it's an instinctive click.

Would it be progress if every design could reflect a more nuanced view of human nature?

TRISTAN: That's right. Right now, all technology is asking only our instincts to find the best way to make us spend our time by impulsively taking the next few actions instead of asking us how to best spend our time in life.

Thinking about the perfect timeline that leaves something behind is what makes my last day here at TED meaningful.

CA: Facebook, Google, everyone's priority is, "Choose whether you're optimizing for the reflective brain or the instinctive brain."

(Tristan) Yes, there is another way.

CA: I also thought it was interesting that you used the word persuasive, and I think there are two kinds of it.

There's also persuasiveness, which consists of reasoning, thinking, and argumentation, which is what I'm doing right now, but I was talking about another kind of persuasiveness in my talk, which is a more intuitive type of persuasion, where you're thinking and you're being manipulated without even realizing it.

TRISTAN: Exactly, and the reason I'm taking this issue so seriously is because the Persuasive Technology lab at Stanford, where I studied, taught me how to be aware of these techniques.

There were many conferences and workshops teaching secret ways to get people's attention.

But most people don't even know that such a thing exists, which is why this conversation is so important.

Chris: Tristan, you and I know a lot of these companies.

I don't know what you think, but in my experience, there's no shortage of good intentions in this room.

For those who want a better world

I sincerely hope that

Your story doesn't mean that these people are bad people.

The system had unintended consequences, and it got out of hand -- TRISTAN: It's a race for attention.

The race for attention is the epitome of "race to the bottom," and it's very intense.

If we want to get more, we have to go deep into the brainstem, provoke anger, fuel emotions, get to the visceral brain.

Chris: The insight on this issue was brought to me by

It was Tristan Harris. Thank you. (Tristan) Thank you.

(applause)

I'm from South Chicago, and when I was in middle school, I had a best friend named Jenny, and she lived in Southwest Chicago.

She's white, and if you know about Chicago's regional segregation, you know that there aren't many black people living in southwestern Chicago.

But Jenny was my best friend, and we used to hang out after school and on weekends.

One day, I was in Jenny's living room, maybe 13 years old, and Jenny's little sister, Rosie, was with me.

Rosie poked me on the shoulder when we stopped talking.

I said, "Can I ask you something?"

If you say "Okay Rosie"

"Are you black?"

(Laughter) The room fell silent.

Silence

Jenny and Rosie's mother was nearby.

I overheard the conversation in the kitchen, and was very upset.

I said, "Rosie, you shouldn't ask that."

I can feel Jenny's embarrassment.

I felt a little sorry for him because I wasn't angry at all.

For Rosie, who was only 10 years old, it was natural that she didn't know.

There is no way

What was even more surprising was that I had been very close to Jenny's family all this time, spending time with them, playing with them, joking around with them, but Rosie didn't even bother to ask me if I was black until she touched my hair.

It was then that I realized for the first time that my hair was a big part of my ethnic identity, and it had a lot to do with how I was perceived in society.

Garrett A. Morgan and Madam C.J. Walker were pioneers of the black hair care and beauty industry in the early 1900s.

They are famous for inventing medicated hair creams and curling irons that permanently or semi-permanently changed the texture of black hair.

When I think of the history of black people in America, I think of the hateful acts and the many injustices they've been subjected to as people of color because of their different skin colors, but in fact, in post-Civil War America, the number one distinguishing feature of being an African American, male or female, was hair. It wasn't skin color.

So before those products became the workhorses of the multi-billion dollar hair care industry, reliance on products like hair straighteners and curling irons was to help black people survive and rise in post-emancipation America.

Over time, the idea took hold that straight, long hair is more beautiful.

We were obsessed with that idea and the following words were born:

"good hair"

What this means is that hair is better without curls.

That kind of thinking took hold, and it gave birth to a false perception of what is good hair and what is not.

Even worse, this false ideal undermines our self-perceptions and continues to affect our cultural identity as African-American women.

What do you mean?

We go to the salon every six to eight weeks, and we definitely go to the salon to expose our scalp to strong hair straighteners.

Apply heat of over 230 degrees to your hair almost every day to straighten your hair

Or you can hide your hair with a wig or a braid, and remove it only when you're out of sight, so no one can see what it actually looks like.

Because it's only done within the black community, the typical model that the general public has of today's working black women, especially in American society, is often something like this, not this.

and this is never possible

In September of this year, a federal court ruled that it was illegal to decide whether to hire someone because they had dreadlocks.

In that case, a recruiter in Mobile, Alabama, is on record as saying, "I'm not saying it's sloppy, it's just.

You know what I mean? ”

what does she mean?

Are dreadlocks ugly?

Or maybe it's too much Afro and too much blackness?

Maybe black culture isn't the problem, but it's too "urban" to work in?

Maybe they were worried that they might look scary, that they would scare their clients and customers.

These are the words we hear so often, negative words about natural hairstyles.

this is

i have to change

A 2013 Deloitte Inclusion Leadership Center white paper surveyed 3,000 people in executive positions on workplace coverings based on appearance, beliefs, affiliation and relationships.

When it comes to physical coverings, research shows that 67 percent of women of color cover physical appearances at work.

Of those who say they cover up about their appearance, 82% say it's "somewhat" or "very important" to improve their careers.

this is ursula burns

She's the first female African-American CEO of a Fortune 500 company and the head of Xerox.

She's known for her unique style, and you can see it when you see it.

Short and neatly trimmed afro hair

Ms. Burns is what we call a "natural girl."

She exemplifies to African-American women that it's possible to move forward with a natural haircut.

But the majority of African-American women today, who are leaders, icons, and role models, still choose straight hair.

Maybe it's just because I want to do it, because it's what I really love to do the most, but maybe no, I think it's because I feel like I have to do it in order to reach the success that I have now.

There's a natural hair movement taking off across the country, and even in some European cities.

Millions of women are exploring what it means to have natural hair, cut the ends that have been painful and dry for years, and restore the natural curls.

I've been promoting and publicizing this movement for about three years now.

Twenty-seven years of exposure to high fevers and powerful drugs had left my hair in tatters.

It was torn, thinned, dry and stiff.

The long pursuit of the age-old concept of beauty, which I just showed you, has taken its toll.

I wanted to do something about it, so I started the "No Heat Challenge," where I didn't use any tools to heat my hair for six months.

I'm a typical millennial, so I documented it on social media.

(Laughter) I even recorded how I tearfully cut off nearly 10 cm of my beloved hair.

I also recorded how I struggled to handle natural hair, how I couldn't make good use of natural hair, and how I didn't think it was cool.

Over time, my hair texture gradually changed.

By sharing this experience, I realized that I wasn't the only one going through this, and there were thousands and thousands of women who wanted to do the same.

They asked me, "Cheyenne, how can I have natural hair like yours?"

“If the product you started using has changed the quality of your hair, is it good for my hair?”

"What kind of natural hair care should I do to slowly improve my hair quality?"

But at the same time, I've found that many women are unable to take the first step, because they're paralyzed by fear.

I'm afraid I don't know what it looks like

I'm worried about what I think of myself with natural hair

And the most important thing is how other people see you.

Over the past three years, in many conversations with friends and people I've never met around the world, I've learned something very important: for African-American women, their hair is their identity.

So I think, to that recruiter in Mobile, Alabama, I would say, "No.

I don't understand what you mean."

But we also know

If black women could truly love their natural hair, it would help dispel generations of old beliefs that raw blackness is not beautiful and should be hidden.

Black women have experimented with different hairstyles to express their individuality and their social advancement.

And if we can have natural hair in the workplace, we'll be appreciated for who we are, grow, and even advance our careers.

let me say the last

In a time of heightened racial and social tensions, I believe that embracing this movement, and others like this, will give us a chance to step out of our current situation.

So when you see a woman with braids and dreadlocks, or you notice that your co-worker has stopped coming to work with straight hair, don't just approach her and compliment her or ask if you can touch her.

please praise

You can give me a high five if you want

because it's not just about hairstyles

It's a matter of self-love and self-esteem

It's a sign of courage.

It's about knowing that by deviating from the norm, you don't define yourself, but rather, you're revealed as you are.

Finally, it's easier to be brave if you believe that people around you are tolerant.

So, starting today, I believe that everyone here is tolerant.

thank you

(applause)

Michael Browning was an engineer, an innovator, a true inventor, and my dream father.

His passion for flying can also be seen in a rather shady retirement gift from the 1970s.

About 40 years after that memento, a few friends got together and set out to take on the long-held human dream of flying in a very different way.

I will now tell you about that challenging journey.

The starting point is a hypothesis about the human mind and body, and as you saw at TED the last few days, humans are really, really good.

What if we extended this wonderful machine with the right technology?

How far can you reach if you try to fly in the sky with a realistic approach?

This is my training partner, Mr. Denton, in London.

As you can see, it's London.

The idea is to augment this

how to enhance?

I bought one of these

It's a small gas turbine.

So that's where we started, and this little kit turned out to be pretty good, so we took two and went to the big one.

By the way, the real hero here is the woman right behind me, tending the veggies, doing a good job of ignoring us (Laughter).

You can see the thrust in this video I can't keep it level

It has about 50kg of thrust

feeling pretty good

I thought it looked promising

There's only one rational way to go from here, use four.

(Laughter) I'll be honest, it's still fun to watch.

Then I deliberately decided to distribute the load.

Your legs are designed to support your load, so why not use them?

It was good there

Harness was out of ideas, as you can see.

(Laughter) You see, it's not going to work.

It was all about trying and learning from failure

Failure includes falls

Did you notice? We've got five planes here -- we're not resting just because one plane is being repaired, and we're continuing the experiment.

(Laughter) I damaged the fuel tube here.

Again, I learned not to make the same mistake again.

this was a dead end

(Laughter) It's three on each arm, which is crazy.

70 kilograms of thrust per arm

removed one by one

(Laughter) But we're starting to see progress that's pretty convincing.

Take a look, isn't it nice?

One on each leg and two on each arm is enough thrust for the calculations.

I'm going to show you what I tried from there, and it's still fun to watch.

This is the first time I've been able to fly stably for six seconds.

(Applause) It's the first time since I've been here that this effort has gone from "I have no idea if it's going to work" to "Oh, that's cool."

I've made improvements since then, but I keep falling over.

Like I said, you know best when you fall.

After a while, the overall arrangement was polished.

As you can see, it's more stable and more controllable, no wires, nothing, including the plastic canister in the back that holds the electronics, as we've improved our technology and learned a lot about balance and control.

To protect your ears, I'll turn off the sound in the next video and explain.

Jet engines are a bit noisy

this was just a few weeks ago

As you can see, the stability and control are really, really, really good, and I think this confirms the first hypothesis, which was that if you augment the human mind and body properly, you can do pretty amazing things.

Because at this point, I have no idea where to move my arm.

When I look in the direction I want to go, it's like riding a bicycle, and my arms move on their own.

It was a very strange experience

What are the goals of this project?

This should land nicely in the landing scene.

I don't think the day will come anytime soon when someone will use this device to go shopping or drop off their kids at school.

Our commitment is to bring the extraordinary experience of flying beyond events and spectacles to more people.

We're also looking for a second and third pilot, and we're looking for volunteers.

This is my current dream

It may sound reckless, but if you stick with it, one day you might be able to soar off the beach and fly up and down the coastline a little higher than you are right now — and I'm working on the safety gear to make that happen.

A transport plane with its cargo compartment hatch open flew in from the horizon.

When the plane passes by, I want to pick up speed, catch up with the plane, and hop from behind -- I don't recommend from the front -- into the rear.

It's still a long way off at this point.

But if I take a big step back now, it's also been a very personal journey for me.

The fun picture from earlier — back to the picture within the picture

Sadly, my father died when I was 15, leaving me with many unfulfilled dreams.

My father was a brilliant inventor and a self-made creator.

I think if -- if my father was looking down, I'm sure he'd see the way we came and would smile, and I'd dedicate the project to him.

thank you very much

(Applause) (Person's voice) I'm probably more nervous about the demonstration that's going to follow than I'm talking about.

There's a lot to do for the demo.

The worst possible scenario is not getting off to a good start.

Or make an unexpected mistake in flight.

That's why it doesn't fly high.

But it might be more interesting for everyone

(music) (increasing engine noise) (cheers)

I want to talk about the global refugee crisis. My aim is to show that this crisis is manageable, not insoluble, but at the same time, it's not just a challenge for refugees on the front lines, it's also a question of who we are.

As someone who runs an NGO that helps refugees and displaced people around the world, this is a professional responsibility.

it's also a personal story

this is my favorite photo

The amazing second picture on the right is not me

My father Ralph is with his father Samuel in 1940 London.

Two were Jewish refugees from Belgium.

I escaped the day the Nazis invaded.

this is also my favorite photo

A group of refugee children from Poland arrived in England in 1946.

In the middle is my mother Marion.

I was sent to start a new life in a new country on my own.I was only 12 years old.

One thing is clear: if Britain hadn't taken in refugees in the 1940s, I wouldn't be here.

70 years later, things have come full circle.

Walls are being built, political rhetoric is full of hate, humanitarian values ​​and morals are burning down, in the very countries that 70 years ago said they would never again let the victims of war lose their country and their hopes.

Last year, conflict, violence and persecution displaced 24 new people every minute, chemical weapons were used again in Syria, the Taliban raged in Afghanistan, Boko Haram kidnapped schoolgirls from schools in northeastern Nigeria.

Refugees don't come to other countries in search of a better life.

I ran away to survive

It's such a shame that one of the world's most famous refugees couldn't be here today to speak.

many of you have seen this photo

It shows the corpse of three-year-old Syrian refugee Alan Kurdi, who died in the Mediterranean in 2015.

He died along with 3,700 others who tried to reach Europe.

The following year, 2016, 5,000 people died.

It's too late for them, but there are still millions of people who can make it in time.

Frederick for example

I'm in the Nyarugusu refugee camp in Tanzania.

Burundi refugee

I wanted to know where I could finish my education.

I went to school for 11 years, so I want to finish

"I hope I don't spend the rest of my life in this refugee camp," he said.

Halud can make it in time

Her parents are Palestinian refugees living in the Yarmouk refugee camp in Damascus.

Born to refugee parents, she is now a refugee in Lebanon herself.

She works for the International Relief Committee to help other refugees, but she has no idea where her future lies and what awaits her.

This is the story of millions of people like Frederick and Halud, why they're displaced, how they survive, what support they need, and what our responsibilities are.

I believe that the biggest question of the 21st century is, "What is our responsibility to others?"

When we think of our future selves, we can't help but think of our responsibilities to others.

As you all know, the world is more connected than ever before, but there is a great danger that divisions will dominate people's minds.

And there's no better indication of that than how we treat refugees.

The fact is, last year, 65 million people were displaced by violence and persecution.

If it were one country, it would be the 21st largest country in the world.

The majority, 40 million, remain in their home countries, but 25 million are refugees.

crossing the border into a neighboring country

Many of them live in relatively poor or lower-middle-income countries, such as Lebanon, where Halud lives.

In Lebanon, one in four people is a refugee. Refugees make up a quarter of the population.

And the refugee status will last for a long time.

The average length of evacuation life is 10 years.

I visited Dadaab in eastern Kenya, one of the largest refugee camps in the world.

It was established in 1991-1992 as a "temporary camp" for those fleeing the civil war in Somalia.

I met Silo there

Without thinking, I asked, "Do you think you'll ever be able to go back to your hometown in Somalia?"

And she said, "What do you mean by going home? I was born here."

So I asked the camp administrator, how many of the 330,000 camp residents were born there, and he said 100,000.

That's what "long evacuation" means.

The causes are deep-seated: weaker nations are unable to support their peoples, the international political system is at its weakest since 1945, and there are wide differences between Islamic nations in their religion, governance and engagement with the outside world.

This is a long-term problem that spans generations.

The refugee crisis is a trend, not a temporary one.

And the problem is complex. When people have long-term, difficult, big problems, they tend to think they can't do anything about it.

When Pope Francis visited the island of Lampedusa off the coast of Italy in 2014, he denounced us all as a "global expansion of indifference."

that's a harsh word

that everyone's heart is like stone

I want you to tell me

Is it acceptable to argue against the Pope, even at TED?

but i don't think it's right

We all want to change the status quo, but we just don't know if there is a solution to the refugee crisis.

My point is that the problem is undeniable, but the solution is undeniably there.

Solution 1: Refugees need jobs in the countries they live in, and the countries they live in need significant financial support.

A 2014 study in Uganda found that 80 percent of refugees living in Kampala, the capital, had jobs and did not need humanitarian assistance.

I was supporting my life with my work.

Solution 2: When evacuations last this long, children's education is a lifeline, not a luxury.

Given literacy and numeracy and the right social and emotional support, children can bounce back.

i've seen it with my own eyes

But among refugee children, half of primary-age children are not educated, and three-quarters of secondary-age children are not educated.

it's a terrible story

Solution 3: Most refugees live in urban areas, not in refugee camps

If you were a refugee living in a city, what would you want?

Money to pay rent or buy clothes

The humanitarian assistance system of the future, at least for the most part, should be like that, giving cash can empower refugees and help the local economy.

The fourth solution is also controversial, but it's something that needs to be debated.

Vulnerable refugees need to be given a new start, a new life, in a new country, and that includes the West.

They're relatively small in number, in the hundreds of thousands, and if not in the millions, the symbolism is big.

Now is not the time to shut out refugees like the Trump administration is doing.

It's time to welcome those who have been victims of horrific experiences.

And remember -- (applause) if someone asks you, "Are those refugees being screened?"

I think that's a perfectly good question

The truth is, refugees who come for resettlement are scrutinized more severely than any other person who comes to our country.

So the question is a valid one, but saying that "refugees are another name for terrorists" is irrelevant.

Think about — (applause) what would happen if refugees couldn't get a job, couldn't send their kids to school, couldn't get the money, didn't have a legitimate way to get their hopes up?

What if they were forced to choose a perilous journey?

Two years ago I went to the beautiful island of Lesbos in Greece.

An island of 90,000 inhabitants

Half a million refugees crossed this island in one year.

Let me show you what I saw when I drove north of this island, a mountain of life jackets left behind by people who made it to the shore.

As I got closer, I saw a little child's life jacket, the yellow one.

I took a picture

You can't see what it says, so let me read it to you.

"WARNING WON'T PROTECT DROWING"

In this 21st century, when children fall out of boats trying to cross to Europe in search of safety, they're given life jackets that don't work.

This is a challenge, not just a crisis

It's a challenge that civilization has faced since time immemorial.

test our humanity

It's a touchstone that asks us Westerners who we are and what we believe.

It's a touchstone that tests not only our policies, but our character.

Refugees are a difficult thing to deal with.

come from far away in the world

I have a deep wound in my heart

often have different religions

But that's exactly why we should help refugees, not why we shouldn't.

We should help them show who we are.

our values ​​are being questioned

Compassion and altruism are the two cornerstones of civilization.

By turning that compassion and altruism into action, we can live a life that meets our basic moral beliefs.

In the modern world there are no excuses

You can't say you didn't know what was happening in Juba, South Sudan, or Aleppo, Syria.

The news is out on the smartphone in the palm of your hand

Ignorance is no excuse at all

If you don't help, you're showing us that we have no moral compass.

It also reveals how we know our history.

Refugees have rights all over the world because of the extraordinary leadership of the Western world after World War II that established universal rights.

To throw away refugee protection is to throw away our history.

This also -- (applause) demonstrates the power of democracy as a refuge from dictatorships.

You've heard politicians say, "I believe in the power of our example more than in the display of our power."

What we stand for is stronger than the bombs we drop.

Refugees seeking refuge see the West as a source of hope and a land of dreams.

Russians, Iranians, Chinese, Eritreans, Cubans come to Western countries for their own safety.

If you're going to abandon them, do so with the appropriate resolution.

Another thing that reveals about us is how humble we are about our mistakes.

I'm not one of those people who believe that the West is the root of all evil.

it's not like that

But when you make a mistake, you should recognize it.

It's no coincidence that the United States, which has hosted more refugees than any other country, has hosted more Vietnamese refugees than any other country.

it tells a story

In more recent history, we have Iraq and Afghanistan.

We can't undo diplomatic mistakes with humanitarian action, but when we've broken something, we have a duty to help fix it, and that's our duty now.

Remember when I said at the beginning that the refugee crisis is manageable, not insoluble?

It's true. I want you to think in new ways, but at the same time, I want you to take action.

If you say you're an employer, hire refugees.

If my story convinces you, please correct the misconceptions of your family, friends, and colleagues.

If you have money, donate to help refugees around the world.

If you have the right to vote, please vote for politicians who will implement the solutions I spoke of.

(Applause) Obligation to others comes in small and big, mundane and heroic ways.

In 1942, my aunt and grandmother were living in German-occupied Brussels.

They were summoned by the Nazis to come to Brussels station.

my grandmother immediately thought something was wrong

I begged all my relatives not to go to the Brussels station.

No one listens, "If you don't do what you're told, you're in trouble."

You can imagine what happened to the people who went to Brussels station.

I never saw them again

My grandmother and aunt went to a small village south of Brussels, where they spent their holidays ten years ago, and knocked on the door of a farmhouse.

They helped me. By the end of the war, there were 17 Jews living in the village.

When I was a teenager, I said to this aunt, "I'd like to meet that Mr. Morris."

"I'm sure he's still alive, so let's go see him."

I went to see him, I think in 1983 or '84.

Maybe it's because I'm a teenager, but when I met him, he was a gray-haired gentleman, and I asked him, "Why are you hiding?

It would have been dangerous."

He looked at me, shrugged, and said in French, On doit.

I think I have to

as if it were a matter of course

said naturally

Shouldn't this be normal and natural for us?

I want to tell everyone that this refugee crisis is not insoluble, it is manageable, and that each of us has a personal responsibility to help solve it.

Because this saves refugees and their lives, but it also saves ourselves and our values.

thank you very much

(Applause) (Bruno Giussani) Thank you, David. (David Miliband) There you are.

Bruno: It's a very strong proposal, and it's also very strong in that it's a personal responsibility.

That leadership was born in a highly scarred and agreed upon political space, while the contemporary political space is fragmented.

Refugees are actually one of the sources of that division.

Where does today's leadership come from?

David: I think you're right about the difference in character, speed, and way of thinking between leadership in war and leadership in peacetime.

My answer is that leadership must come from below, not from above.

A recurring theme at this conference is the democratization of power.

We must protect democracy, but we also need to rejuvenate democracy.

And in my case, when people say, "There's a backlash against refugees," I say, "No, there's a polarisation, and right now it's just that the scared are louder than the proud."

My answer to your question is that together we can give support, encouragement and confidence to leadership.

And those looking for leadership should look within their own communities and try to rally their internal forces to create the conditions for different types of solutions.

(Bruno) David Thanks for coming to TED.

(applause)

First of all, I would like to tell you about a very rare opportunity and experience that I have had over the past five years to visit some of the poorest countries in the world.

Scenes like this are everywhere these days. Children are staring at smartphones. Smartphones are having a huge impact, even in the poorest countries.

At one point, I said to a colleague, "I feel like there's a lot of ambition going on all over the world.

And it looks like we have similar goals.”

We got a few economists together to find out what really happened.

what the world really wants

It's about whether it's coming together

And what we've learned from Gallup's Life Satisfaction Survey and others is that people who have access to the Internet are more likely to be satisfied with their lives.

But at the same time, something very important happens: your "reference income," the amount you compare your income to, goes up.

For example, if a country's reference income rises by 10 percent relative to other countries, on average, that person's own income must also rise by at least 5 percent to maintain a level of life satisfaction.

And when you get to the lower income brackets, if the reference income goes up by 10 percent, the income has to go up, it needs to go up by about 20 percent.

So, now that ambition is on the rise, there's a fundamental question: What could happen in the future is that ambition is combined with opportunity to create momentum and lead to economic growth, as happened, for example, in South Korea, the country where I was born.

Or is dissatisfaction just waiting beyond the ambition?

This is a serious concern, because the number of terrorist incidents increased by 74 percent between 2012 and 2015.

The number of people killed in terrorism has increased 2.5 times.

Two billion people today live with danger, conflict and violence, and by 2030, more than 60 percent of the world's poor will be living with danger, conflict and violence.

So how do we respond to people's aspirations?

Can't we come up with a new way of thinking to do our part?

I'm very worried if I can't

The Internet is making people more ambitious than ever before.

It's time for everyone to have a peek into everyone else's lives.

Are you developing the ability to respond to the ambition that arises in such an environment?

I'd love to talk to you in more detail, so I'd like to start with my own story.

This woman is not my mother, but this is exactly how she escaped wartime Seoul, carrying her sister on her back, sometimes on foot, during the Korean War.

And through a series of miracles, my parents were both able to go to New York on scholarships.

They actually met and got married in New York.

my father was also a refugee

When I was 19, I left my family behind in North Korea, crossed the 38th parallel, and never saw my parents and siblings again.

My father, married to my mother and living in New York, worked as a waiter at a famous restaurant.

Parents' Dreams Expanded

He knew what it was like to live in a city like New York in the 1950s.

After my brother was born, my parents returned to South Korea, and as far as I can remember, they lived a fairly peaceful life, but at the time South Korea was one of the poorest countries in the world, and it was a politically turbulent time.

There were constant protests on our doorstep, and students were protesting against the military regime.

At that time, the World Bank Group, of which I am now president, had very low expectations of South Korea.

I thought that without external assistance, we would not be able to guarantee a more than basic living for our citizens.

South Korea was in trouble.My parents knew what life was like in America.

I got married and gave birth to my brother in America.

So I decided that if I was going to give us a chance to fulfill the dream I entrusted to my child, I would have to go back to America.

Our family, who returned to America in this way,

first lived in dallas

My father went to dental school and got his degree back.

After that, for some reason, I moved to Iowa.

my brothers grew up there

All my education was in Iowa.

I left high school and went to college

Then one day, something I will never forget. After finishing my sophomore year, my dad picked me up at college, and on the way home, in the car, I said, 'Jim, what's your dream?

What do you want to learn and what do you want to do? was asked

My mother was actually a philosopher, and she had instilled in me ideas of protest and social justice.

So my father, who was a Korean dentist, slowly pulled the car over to the side -- (Laughter) -- and he looked at me and said, "First, get your medical license, and then do some studying."

(Laughter) I've told this story before in a mostly Asian audience.

Everyone nodded without anyone laughing

as if it were a matter of course

(Laughter) (Applause) Sadly, my father passed away early, 30 years ago at the age of 57. I'm exactly the same age he was at the time.

I studied both in graduate school.

And it was around that time that I met these two people, Ophelia Dahl and Paul Farmer.

I was with Paul at the hospital.

He and I both studied medicine and concurrently completed a doctoral course in anthropology.

I began to have very fundamental questions.

I had the privilege of studying medicine and anthropology, but my parents were refugees.

As a child, Paul lived in a bus in the swamps of Florida.

I used to call myself "lower whites"

But we had the opportunity to ask ourselves, What should we do?

What kind of responsibility do we have to the world when we think about this jokingly high education?

So we decided to start an organization together called Partners in Health.

By the way, this story was also made into a movie.

(Applause) It's a great movie called "Bending the Arc."

It premiered at the Sundance Film Festival in January this year.

Thanks to Jeff Skoll and all the other people who are here.

When we first started, we started thinking, "What does it take to fulfill the dreams of people in the poorest parts of the world?"

This is a picture from my first trip to Haiti in 1988, and that year we crafted a sort of mission statement to put the poor first in health care.

This took me a long time, doing anthropology in graduate school.

Marx's books are read from scratch

Habermas, Braudel, etc.

I read a lot of books and decided how to structure my business.

I used to say "poor" because it prioritizes the poor.

The most important thing about "pro-poor action" is what it isn't.

It's not an activity to make you feel like a hero.

It's not an activity that sticks to theories about how to lift the poor out of poverty.

It is not an activity that prioritizes one's own organization

The hardest thing isn't what you think the poor are doing first,

It's a movement that prioritizes the real poor.

What kind of activity is that?

In Haiti, the first thing I did was, everyone said, "If it's cost-effective, I'll just focus on immunizations, and sometimes feed them."

But what the Haitian people wanted was a hospital.

school or something

It was about giving them opportunities, the kind of opportunities that I had heard about from friends and relatives who had moved to the United States.

Haitians wanted the same opportunities that my parents wanted.

i could feel

That's why, in response to expectations, hospitals and

made a school

We did our best to provide opportunities.

My most intense experiences with Partners in Health began in a poor neighborhood called Carabayo, north of Lima, Peru.

In this area, we started by going door to door, talking to local people, and we learned that there was an epidemic of multidrug-resistant tuberculosis.

This photo

This patient, Melquiades, was about 18 years old at the time, and he had a very nasty form of drug-resistant tuberculosis.

Global health authorities around the world were all saying that treating drug-resistant tuberculosis is not cost-effective.

too much trouble and too expensive

Impossible, say it's impossible

Not only that, but he started getting angry with us, saying, "If I could, I would have already done it.

What are you doing?"

The people we were fighting against were people from the World Health Organization, and maybe the most violent opponent was the World Bank Group.

We did everything we could to convince Melquiades to take his medicine, because it's a very painful treatment.

Why don't you go and treat another patient? ”

(Laughter) I hadn't seen Melquiades for about 10 years, but about two years ago, at the World Bank Annual Meeting in Lima, the film crew sought him out, and here's a picture of the reunion.

(Applause) Melquiades has become a bit of a media darling because he's been in the premiere stage greeting and now knows how to handle an audience.

(Laughter) But as soon as we won -- yes, we won the dispute.

Our argument won that multidrug-resistant tuberculosis should be treated, and in the early 21st century there was the same debate about HIV.

Global health authorities around the world have consistently argued that HIV cannot be cured in poor countries.

It's too expensive, it's too troublesome, it's impossible

But it's actually not that difficult compared to treating drug-resistant tuberculosis.

Patients like this picture were the target

I have a patient named Joseph June.

I never said I was cost-effective.

This is what he looks like after a few months of medication.

(Applause) HIV treatment "returned to hell."

Jocelyn came to see me in this condition.

After a few months, I recovered to look like this

(Applause) Now, I used to think that these controversies and struggles were against organizations that kept saying they weren't cost-effective.

Our opinion was, "No, to put the poor first, we have to raise our expectations to match the dreams and aspirations of the poor themselves."

And he said, "It's a nice idea, but it still doesn't pay."

So we wrote a book that basically criticized the World Bank as a geeky vehicle for Partners in Health.

In my book, I argued that the World Bank is so focused on economic growth that it says governments should cut their budgets, cut spending on health, education and social welfare, but that's fundamentally wrong.

I fought with the World Bank.

Then unexpectedly

President Obama recommended me to be president of the World Bank.

(Applause) When I went to the judiciary under the president, my book was there, and it seemed like they had read it from cover to cover.

Then, "Is that so?

I have fallen."

The president said, "No, no, it's okay."

So, in July 2012, I walked through the gates of the World Bank Group, and the wall said, "A world without poverty, that's our dream."

A few months later, that dream turned into a goal: to end extreme poverty by 2030 and boost shared prosperity.

This is what the World Bank Group is doing right now.

I am proud that I was able to bring to the World Bank an activity that puts the poor first.

(Applause) But since this is TED, I'd like to take this opportunity to raise some concerns and make a proposal.

First, I'm sure you know much more about the Fourth Industrial Revolution, but there's one thing that bothers me: You've heard stories of job losses.

According to data compiled independently by the World Bank, two-thirds of current jobs will be lost to automation in developing countries.

I have to make up for the lost work

One way to do that is by hiring community health workers as regular workers.

this is what i want to do

(Applause) I think the numbers are going to work out. We're going to have better health care, more formal employment, and at the same time, we're going to train local people, and they'll also teach them soft skills, creating a highly effective workforce, and this could be the biggest growth area.

But there's one more thing that's bothering me. It's clear to me that the future of work is going to be more IT-related, but on the other hand, there's a crisis of child stunting due to malnutrition.

This is a photo taken by Charles Nelson at Harvard Medical School.

What this picture tells us is, first of all, the picture on the left is the brain of a stunted three-month-old baby, who is deficient in nutrition and brain stimulation.

On the other side, of course, is the normal infant brain, where the neurons are densely and extensively connected.

Neuron connectivity is important because it's what defines "human capital."

We know it's possible to reduce the rate at which these things happen.

We can bring the rate of child stunting down very quickly. If we don't do this, for example, in India, we have a stunted rate of 38 percent. That's why we're not going to be able to compete in the global economy in the future.

Then what should I do

$78 trillion is the size of the global economy

$8.55 trillion is under management in negative interest rate bonds

What this means is that you have to deposit money in the German central bank and pay more money to keep it.

negative interest rate bonds

$24.4 trillion in very low-yield government bonds

And there's eight trillion dollars in the rich man's pocket, right asleep under that fluffy bed.

Now, what the World Bank is trying to do is to use the tools that it has. It's going to be a little geeky for a moment, but there are techniques that we learned at the World Bank Group, such as primary loss risk bonds, derisking, blended finance, political risk insurance, credit enhancement, and so on.

(Applause) But is it realistic?

Can we actually bring the private sector into the field and make things really work?

There are some success stories

This is Zambia's scaling solar.

An all-inclusive solution, led by the World Bank, that sets the stage for attracting private investors.

In the case of Zambia, the electricity bill was originally 25 cents per kilowatt hour, but it was able to cut costs through simple things like competitive bidding and policy changes.

The minimum bid was originally 25 cents per kilowatt hour.

It's now 4.7 cents, so it's doable.

(Applause) Now I have a suggestion for you.

This is Zipline, a brilliant company, a group of highly skilled technicians.

We've figured out a clever use for drones in Rwanda.

Pictured here is me in Rwanda launching a drone that's supposed to deliver blood anywhere in the country in less than an hour.

So many lives have been saved -- (Applause) -- and ziplines have been profitable, and they've saved Rwanda a lot of money.

This is exactly what the world needs, and we need your help.

So please, in your brain, if only for a moment, think about the technology you specialize in, the company you started, the design you're good at.

Please lend me your wisdom and your strength, even just a little bit.

Lastly, I would like to say one more thing.

It happened when I visited a primary school in Tanzania.

The picture is me in the fifth grade classroom

As usual, I asked the children, "What do you want to be when you grow up?"

Two people raised their hands and said, "I want to be president of the World Bank."

(Laughter) Like you, my staff and the teachers at my school laughed.

I stopped him and said

"Everyone please listen

Korea was like this when I was born

this is my birthplace

When I was three years old, I was in kindergarten, and if the then president of the World Bank, George David Woods, had come to visit my classroom in South Korea, I would never have imagined that the future president of the World Bank would be sitting there.

Never let anyone tell you that you can't be president of the World Bank."

Well... Hi

(Applause) Let me just say one more thing.

Although I come from the poorest country in the world at the time,

President of the World Bank

I cannot stand in the way of those who will follow me.

this is an emergency

people's ambition

rising everywhere in the world

Everyone at this venue, please cooperate.

We know that we can find solutions like ziplines to help the poor dramatically improve their lives, but that won't happen unless we work together.

Our future selves, especially for our children's generation, will depend on how much care and compassion we put into action so that our future selves can give every child in the world an equal opportunity.

thank you

(Applause) Thank you, thank you very much.

(Applause) (Chris Anderson) I'm sure you're all surprised that this is coming out of the mouth of the President of the World Bank.

That's nice. Could you be a little more specific about your proposal?

There are a lot of investors and entrepreneurs at the venue.

Please give me a concrete proposal on how to cooperate

(Jim Yong Kim) Can I talk about maniacs? (Chris) Go ahead (Jim) What did you do?

For example, insurance companies don't invest in infrastructure in developing countries.

We don't take risks, so we keep the money for people who pay the premiums.

So we got the Swedish Agency for International Development to put in a little bit of money, and then we got another $100 million from outside, and the World Bank would cover the first loss.

Now, the tranche, which is 90 percent of the investment, has a credit rating of BBB, and the insurance company has invested.

What the World Bank is doing is using public money on hand to attract outside investment by derisking certain types of bonds, so all of you who have trillions of dollars to spare

come to my house

(Laughter) (Chris) So you're looking for investments that will create jobs, especially in developing countries.

(Jim) Absolutely.

building roads, bridges, harbors, etc.

These kinds of businesses are essential for creating jobs, but I would also like to say that the technology you specialize in, the business you specialize in, may not be of use in the developing world, but there is also the example of ziplining.

In the case of ziplining, it wasn't just the nature of the technology that was decisive.

The early engagement with the people of Rwanda and the use of artificial intelligence -- the local internet infrastructure is very well developed, and the drones fly completely on autopilot.

The World Bank will support such projects.

We will help you make it happen by introducing you and providing funding.

CA: How much is the World Bank willing to provide to support these efforts?

(Jim) You always make me talk like that, don't you?

The World Bank invests $25 billion a year in poor countries, in the poorest countries.

As we continue to invest $25 billion each year for the next three years, we have to work with you to figure out how to use this money more efficiently.

I can't give you a number because it depends on the content of the idea.

Bring it in first. Money won't be a problem.

Chris: You heard it from the President himself, Jim, thank you very much.

(Jim) Thank you

(applause)

my job is to visit the future

Instead of looking at a single future, we go to see many possible futures and then bring the evidence from there to the present for people to experience.

I'm an archaeologist of the future, so to speak.

Over the years, I've visited the future repeatedly and brought back things like a new genetically engineered bee species, a book called "Pets as Protein," a device where you can earn money by selling your genetic data, a sugar-powered lamp, and a computer to grow food.

So it's not actually traveling to different future worlds - for now.

My husband, John, and I spend a lot of time in our workshop, conceiving and creating different visions of the future.

We're always looking for faint signals, whispers of future possibilities.

Then we follow the threads of possibility that lead to the future and ask: What would it feel like to live in this future?

What would you see, hear, and breathe?

Then we experiment, we prototype, we build, we bring aspects of the future to life and make them tangible and tangible, so that you can feel the impact of future possibilities here and now.

But the focus of this work is not to predict.

The aim is to build tools -- tools that help connect our present selves with our future selves -- so that we can become actively involved in the future we want -- the future that works for all.

So how do you go about it?

A recent project called Drone Aviary is trying to explore what it's like to live in a city with drones.

Drones can see things we can't see, they can go places we can't go, and they're becoming more and more autonomous.

But understanding this technology requires hands-on learning.

So we assembled some drones in our workshop.

We named each one, gave them a function, and let them fly.

I've had parts come loose, I've had trouble handling GPS signals, I've crashed.

But it's thanks to these trials that I was able to experimentally construct one possible future in a very specific way.

Let's go to such a future

Let's say we have a drone like this in our city.

With a drone called Nightwatchman

I often see them patrolling the streets in the evenings and at night.

At first, many people were concerned about the low, dull sound of flying drones.

Anything we get used to

Now, what would it be like to see the world through the eyes of a drone?

For example, I keep a log of my neighbors, and if I see a kid playing soccer in a place where it's illegal to play ball, I'll record him as a nuisance.

(Laughter) And here's another group of young people about to go into action to stop delinquency.

This is a big saucer drone called Madison.

It has an overwhelming presence, and I can't help but stare at it.

But every time I look at this, it seems like they know a little bit more about me.

I'm not sure if I should think of this kind of feature as a little fun or as a terrible intrusion.

back to the present

We learned a lot by trying to create a future like this.

You can see not only how these machines work, but what it's like to live with them.

Drones like Madison and Nightwatchman don't exist in their natural form, but the fundamental elements of future drones are already here.

For example, facial recognition systems are ubiquitous. They're built into our phones, our climate controllers, our surveillance cameras all over the city.

We already have these devices, but we often don't really understand how they work and what the possible consequences are.

We are surrounded by devices like this

Our difficulty in imagining the consequences of our current actions will affect our future.

In the UK, where I live, last year [2016], a referendum was held on whether to stay in the EU or to leave the EU, the so-called "Brexit".

As soon as the results of the vote came out, the term "Bregret" (British Regret) was coined (Laughter) to refer to the actions of those who voted to leave the European Union in protest but did not give enough thought to the consequences.

These discontinuities are manifest even in the simplest of things.

For example, let's say you go out for a quick drink

I'll have a few more drinks soon

You know you're going to wake up feeling terrible the next morning, but you justify it by thinking, "I'll let my future self take care of that."

But the next morning, you realize that your "future self" is who you are today.

In India, where I grew up in the late 1970s and early '80s, there was a sense that we needed to, and could actually, plan for the future.

My parents had to plan even the simplest things.

My parents, who wanted to install a telephone in their home, had to wait for a long time after applying.

(Laughter) And if I wanted to call my grandparents in another city, I'd have to sign up for a "long distance call" and wait hours, even days.

And then suddenly at two o'clock in the morning, when the phone rings, we're all jumping out of bed, gathering around the phone, and yelling into the receiver and asking how we're doing, it's two o'clock in the morning.

Change is so fast these days that it's really hard to understand where you are in history.

That's why I feel so overwhelmed by uncertainty and anxiety that I just let the future take its course.

We still don't feel our "future selves" as ours

You treat your future self like a stranger and your future like a foreign land.

The future is not foreign; it is still in front of us and is being shaped by our actions today.

We are that future, and the need to fight for the future we want has never been greater, and I think it's time to wait.

Through our work, we've learned that one of the most powerful tools we have for influencing change is to make people aware of the future consequences of their current actions through direct, tangible and emotional experience.

This year, we were invited to the United Arab Emirates (UAE) to help shape their energy strategy to 2050.

Based on economic data from the UAE government, we created this metropolitan model to visualize a number of possible futures.

As I was enthusiastically demonstrating our model of a sustainable future to government officials and energy companies, one of the participants said to me, "I can't imagine a future where people don't drive themselves, they use public transportation."

He continued, "I can't tell my son to stop driving."

But I expected this reaction

In our home city in India, we worked with a chemistry lab to create a rough sample of what the air would look like in 2030 if people's behavior remained the same.

And then I took this group of people to a device that spews out air samples.

Just by having them sniff the polluted air of 2030, I was able to get a sense of reality that cannot be obtained from any amount of data.

This is the future that no one wants their children to inherit.

The next day, the UAE government made a big announcement.

We're going to put billions of dollars into renewable energy.

I don't know how much our experience of the future influenced this decision, but we do know that we changed our energy policy to mitigate that scenario.

Things like air from the future can be very specific and effective, but the paths from our present to future outcomes aren't always so linear.

Even a technology developed with high ideals loses its developer's control the moment it leaves the lab and enters the real world.

In one project, we explored medical genomics, the study of collecting human genetic data and using it for personalized medicine.

We asked: What unforeseen consequences would come from combining genetics and healthcare?

To explore this issue further, we have presented 31 pieces of carefully crafted evidence in a fictitious lawsuit.

I set up an illegal genetic clinic, built a DIY incubator, and even bought frozen mice on eBay.

Now, let's go to the future, where this lawsuit is taking place, and meet defendant Arnold Mann.

Arnold was sued by a global biotech company called Dynamic Genetics, alleging evidence that Arnold had illegally introduced into his body genetic material that was patented by the company.

Arnold, why would you do that?

It all started when Arnold was asked to collect a saliva sample in this kit and submit it to the UK's National Health Service (NHI).

When Arnold's insurance bills arrived, he was shocked to discover that he was being charged an outrageously high premium that he and his family couldn't afford.

The national insurance system scanned his genetic data to discover chronic disease risks hidden in his DNA.

Start paying for the potential costs of treating your illness today.

Frightened and panicking, Arnold ventured into the underworld and sought treatment in an illegal clinic, tampering with his DNA to avoid being considered a risk by premium algorithms and avoiding expensive insurance claims.

But this act is exposed

So the "Dynamic Genetics v. Mann lawsuit" began.

In presenting a future like this, we've made it a point to let people see and feel those possibilities, because that up close, first-hand encounter with the future asks the right questions.

Who owns the rights to my genetic data and what do they do with it?

You might think it's impossible, or too far-fetched, but the U.S. Congress is about to pass an obscure piece of legislation called the Employee Wellness Program Protection Act (HR 1313).

This amends the Genetic Information Non-Discrimination Act, commonly known as GINA, and is the first bill to allow employers to require all employees to disclose family medical information and genetic data.

If you refuse to disclose it, there will be heavy penalties.

In the projects you've seen so far, whether it's drones or genetic crime, they've presented the ugly side of the future so that we can avoid an unwanted future.

But what about the things you can't avoid?

Right now, we seem to be heading towards a dead end, especially on climate change.

So what we want to do now is to prepare for that future, to build and nurture hope -- the tools and attitudes that empower us to find hope that inspires action.

Right now we're doing an experiment in the workshop.

still in progress

Based on climate data projections, we study a future world in which the West has become less prosperous and scarcer.

Frequent floods, little food in supermarkets, unstable economy, broken supply chains—

Is there a way to not just survive, but thrive?

what can you eat?

To delve deeper into this question, we're creating an apartment room that imagines London in 2050.

It's like a small time capsule brought from the future

I've narrowed it down to the bare minimum

All of the things we really want in our homes -- flat-screen TVs, refrigerators with internet access, and craftsmanship furniture -- are completely out of the question.

Instead, we build our food computers out of scraps and reclaimed materials, transforming today's waste into tomorrow's food.

For example, the first fully automated fogponics machine that we just completed.

Rapidly grow crops using fogponics technology that sprays fertilizer without water or soil

So far I've been successful in growing tomatoes.

But the amount that can be grown in this small room is not enough.

Is there any other food available in the city?

insect? Pigeon? Fox?

Before, we brought back air from the future.

This time around, I'm bringing you a whole room, a room full of hope, tools and tactics for taking positive action in challenging environments.

Spending time in this room, which could be our future home, gives us a first-hand experience of the consequences of climate change and food shortages.

Through these experiments and practices and interactions with people, what we're learning is that by creating tangible experiences, we can bridge the disconnect between the present and the future.

By putting ourselves in any number of possible futures and by being open to the anxieties and discomforts our actions may incur, we have the opportunity to imagine new possibilities.

We can find a more optimistic future We can find a way forward We can turn hope into action

It means we have a chance to change direction, a chance to speak up and write our own will on the future we want.

another world is possible

thank you

(applause)

1987 Thousands of people flock to Saudi Arabia for the annual Hajj pilgrimage to Mecca

What started as a celebration turned into a health crisis, and just days after the pilgrimage, more than 2,000 cases of meningitis spread across Saudi Arabia and around the world.

The outbreak was violent and caused a deadly epidemic of meningitis that is believed to have eventually infected tens of thousands of people worldwide.

Meningitis is inflammation of the meninges, the three layers of tissue that protect the brain and spinal cord.

What makes meningitis more dangerous than other diseases is how quickly it invades the patient's body.

Worst case, you die within a day.

Luckily, most patients who get treatment early don't get that.

There are three main causes of meningitis: fungi, viruses, and bacteria, and bacteria are the most deadly of them, so we'll focus on them.

Bacterial meningitis is usually contracted when an infected person coughs or sneezes and inhales droplets of mucus or saliva that are sprayed into the air.

It can also be transmitted through kissing, sharing cigarettes, toothbrushes, utensils, etc.

Some people who are infected and have the disease remain asymptomatic and have no symptoms, and in such cases they pass the disease on to others much more quickly.

When bacteria enter the nose, mouth, or throat, they pass through the surrounding mucous membranes and into the bloodstream.

From there bacteria rapidly enter systemic tissues, including the blood-brain barrier From there, bacteria rapidly enter systemic tissues, including the blood-brain barrier

The blood-brain barrier is a tight mesh of cells that separates the brain from blood vessels and blocks all molecules except certain molecules, such as water molecules and some gases.

But in ways that scientists don't yet understand, meningococci trick their way through that barrier.

Inside the brain, bacteria quickly infect the meninges.

This triggers the body's strong immune response, which causes inflammation, fever, and severe headaches.

The swelling of the meninges progresses and the neck begins to stiffen.

Swelling of the brain disrupts normal function, resulting in hearing loss and extreme photophobia.

Increased intracranial pressure can lead to confusion, which is one of the hallmarks of the disease.

The rapidly dividing bacteria begin releasing toxins within hours, which causes sepsis.

This causes blood vessels to malfunction, causing blood to seep out, a condition that looks like a rash, and a large, widespread bruise.

At the same time, these toxins consume oxygen in the blood, reducing the amount of oxygen reaching major organs like the lungs and kidneys.

This increases the chance of multiple organ failure, and with the spread of sepsis, the chance of death.

It's a very scary story, but the outcome of meningitis is very good, and hospital visits can dramatically reduce adult mortality.

But if left untreated, the potential for lasting damage is greater.

Amputation is at increased risk when low oxygen levels cause cell death in extremities of the body, such as fingers, toes, arms and feet.

And when bacterial toxins build up in the brain, causing cell death, meningitis can cause long-term brain damage and memory loss.

So prompt treatment or even prevention is more important.

Because of this, most countries have vaccines to prevent the disease in its deadliest form.

It's given to people with the highest squirrel counts, such as young children, people with weak immune systems, or people who travel in large groups where meningitis outbreaks can occur.

In addition to these clusters, meningitis is most prevalent in the "meningitis belt" throughout Africa, but it's also found in other parts of the world.

If you or someone you know is worried you may have meningitis, see a doctor as soon as possible. Immediate action may save your life.

My name is Katrina Spade, and I grew up in a family of doctors, so it was very common to talk about death and dying at dinner.

But unlike most of my family, I didn't go into medicine.

I went to architecture school to study design, not medicine.

And while I was in school, I started to wonder what would happen to my body after I died.

What will my relatives and loved ones do with my corpse?

Even if you're not disappointed by the fact that you're going to die one day, or by death itself, you're probably sick of the current customs associated with funerals.

Almost 50 percent of Americans today choose a traditional burial.

In a traditional burial, the process begins with embalming, where funeral staff drain the fluids from the corpse and replace it with a mixture that preserves the corpse and gives it the appearance of life.

After that, as you know, the body is placed in a coffin and buried in a concrete-protected grave.

All together, America's cemeteries contain enough metal to build the Golden Gate Bridge, enough wood to build 1,800 homes, enough formaldehyde-rich preservatives to fill eight Olympic swimming pools.

Moreover, cemeteries around the world are reaching capacity.

Selling land forever is not a sane business.

(Laughter) Who the hell thought

Depending on the location, no amount of money can buy a new grave.

As a result, the rate of cremation increased rapidly.

In 1950, if I had said that my grandmother would be cremated when she died, she would probably have been kicked out of her deathbed.

But today, nearly half of Americans choose cremation for reasons like "it's easy," "it's cheap," and "it's eco-friendly."

I used to think that cremation was the greenest way to dispose of corpses, but think about it.

Cremation destroys what we could otherwise give back to the earth after death.

The process of turning bodies into ashes consumes a lot of energy, pollutes the atmosphere and contributes to climate change.

Cremations in the United States emit a staggering amount of carbon dioxide into the atmosphere, totaling about 270 million kilograms per year.

What's really scary is that the last thing most of us do when we're born on earth is pollute the earth.

It's as if we've carved out a path that leads us to a situation where we're as far away from nature as humanly possible, denying death and making it good.

Modern funerals are designed to postpone the natural processes that occur in the body after death.

So the goal is to keep our bodies from breaking down.

But the truth is, nature is very good at dealing with death.

everyone has seen

When organic matter dies in nature, it is decomposed by microbes and bacteria into nutrient-rich soil, completing its life cycle.

Death creates life in nature

I've been thinking about this all the time when I was in architecture school, and I started drawing up a business plan for a new funeral business.

Can we create a system that benefits the planet and uses nature as a guide instead of fearing it?

A system that does not burden the earth

Because the earth nourishes our living bodies and life itself.

I'm sitting at the drawing board and I'm lost in these thoughts I'm sitting at the drawing board and I'm lost in thoughts when the phone rings

It was my friend Kate

Kate said, "Hey, did you know there's a farm that composts whole cows!"

i groaned

(Laughter) When I did some research, I found that people in farming organizations had been doing postmortem composting of livestock for decades.

Post-mortem composting involves covering nitrogen-rich animal carcasses with a carbon-rich compost mixture.

It's an aerobic process, so it needs oxygen, and it also needs a lot of water.

In the most basic setup, you can cover a cow with carbon-rich wood chips to a depth of about one meter and leave it outside, let nature take its course, and the wind will provide the oxygen and the rain will provide the moisture.

After about nine months, all that's left is nutrient-rich compost.

Now the cow's body has been completely decomposed down to the bones.

it really does

(Laughter) I'm definitely a biodegradation freak, but I'm far from a scientist, to the extent that I'd call the process of decomposition "magic."

(Laughter) The bottom line is that humans simply need to create the right environment for nature to do its job.

Disinfectant soap does the exact opposite.

Instead of fighting microbes and germs, welcome them with open arms.

These micro-powerful organisms break molecules down into smaller molecules and atoms, which eventually join together to form new molecules.

In other words, the cow was reborn.

no longer a cow

returned to nature

hey? it's like magic

As you can imagine, after Kate called me, I had a sudden epiphany.

So I started designing a human-return system based on the principle of post-mortem composting of livestock.

Five years have gone by in the blink of an eye, and the project has grown far beyond what I could have imagined.

We've created a reproducible, scalable, non-profit urban model, a human-to-dirt facility based on the science of post-mortem composting of livestock.

We've collaborated with experts in soil science, biodegradation, alternative funerals, law and architecture.

When we asked for funds from foundations and individuals to design a prototype system, we were contacted by tens of thousands of people around the world who wanted this new burial method to become a reality.

so

Our goal is to build the first full-fledged human composting facility in Seattle in the next few years.

(Applause) Imagine this facility as a public park, as a funeral home, as a place to mourn loved ones, reconnect with the natural cycle, and treat bodies with kindness and respect.

Basic structure is simple

Within the elongated structure known as the "core," the wood chip-covered corpse undergoes a rapid natural decomposition, or composting process, that transforms it into soil.

To do this, the bodies of the deceased are first brought to a human composting facility.

Then friends and family wrap it up in a simple burial shroud and carry it to the top of the core, which contains a natural decomposition system.

Burial rituals place the body gently in a core and cover it with wood chips.

Thus begins the gentle transformation of man to earth.

Within a few weeks, the bodies will naturally compost.

Microorganisms and bacteria break down carbon and proteins to create new substances, rich natural soil.

This soil can then be used to grow new life.

Soon you will be a lemon tree too

(Applause) Yes, thank you.

(Applause) Who's thinking about lemon pie right now?

(laughs) Or is it lemon candy?

Something more flavorful?

Now, in these facilities, not only the core, but also spaces for memorial services and shukatsu can be set up to support times of grief.

Repurposing existing facilities has great potential

Old churches and factory warehouses can be refurbished and transformed into places that create soil and honor life.

Our goal is also to recapture the ceremonial dimension of dying that has become diluted over the past 100 years as cremation rates have increased and religious affiliation rates have declined.

The planned facility in Seattle will serve as a model for similar facilities around the world.

Already inquired from South Africa, Australia, UK, Canada and other countries Already inquired from South Africa, Australia, UK, Canada and other countries

We're in the process of creating a suite of design tools to help others design and build facilities -- technical specifications and regulatory best practices.

We want to help individuals, organizations, and eventually municipalities design and build facilities in their cities.

Because I think it's better for these facilities to have the same internal system, but look and feel completely different.

I want it to be designed for the people who live nearby and for the community.

Another thing we're thinking about is having a support staff on standby to help families gently prepare the bodies of their loved ones.

We're also trying to create a system that's beautiful, meaningful, and understandable to replace traditional funerals that are failing.

Environmentally friendly funerals are a natural human right.

See, you've been saying that for a long time, right? “If cows can be composted, humans can also be composted.”

(Laughter) What the heck, but it's true.

Since 2014, we've been conducting pilot projects in the North Carolina hills with the Department of Forensic Anthropology at Western Carolina University.

The six donated bodies were covered with wood chips, and the wind brought in oxygen, and microbes and bacteria decomposed them.

Thanks to this pilot program, we've proven that we can use the incredible power of natural decomposition to turn human remains into soil, and we're working with several other universities.

Soil scientists at Washington State University -- but graduate students -- are doing a study on composting teeth with amalgam fillings to see what happens to the mercury in them.

After that, we plan to start experiments to determine how the chemotherapeutic agents and pharmaceuticals change during the composting process and whether additional processing is required.

By the way, composting generates a significant amount of heat, especially with our composting method.

A week after we started composting the fifth of the donated corpses, the temperature inside the wood chip mound reached 70 degrees Celsius.

What if that heat could be harnessed to generate energy or provide warmth to the bereaved on cold days?

The funeral revolution has begun

I'm glad I lived in such times

thank you

(applause)

I still remember when I found out I was going to speak at TED.

I ran down the hall to the classroom and informed the students.

"Everyone listen

I've been asked to give a TED talk."

the reaction was unexpected

The classroom became silent

"TED is the one that coaches always show?

A scientist doing really amazing things with a robot? ”

Muhammad asked

"Yes, that's how it feels"

"But Coach Speaker is such a great and smart guy."

(laughs) "I know."

"But coaches don't like public speaking, do they?"

"Sure, I hate it," I said, "But it's important to talk about us — you guys and my journey.

I have to let you know."

In the school I founded, all the students were refugees, and in the end, everyone cheered me up.

"Cool, do your best"

(Laughter) War and persecution forced 65.3 million people to leave their homes.

Of those, 11 million, the largest number, are from Syria.

33,952 people flee their homes every day.

Most of them remain in refugee camps, living in conditions that are by no means humane.

We are complicit in acts that demean humanity.

this is an unprecedented number

The most since World War II

I'll tell you why this issue is important to me.

i'm arab immigrant

I am Muslim

For the last 12 years, I have worked with refugees.

and i'm gay

So it's popular these days.

(Laughter) But I'm the daughter of a refugee.

My grandmother fled Syria in 1964 during the Assad regime.

When my grandmother was three months pregnant, she packed a suitcase, loaded five children into a car, and drove to neighboring Jordan, not knowing what awaited her and her family.

Believing things weren't so bad, my grandfather stayed in the country.

A month later, my brothers were tortured, my factory was taken by the government, and my grandfather followed my grandmother.

They built their lives from scratch and eventually became independent as wealthy Jordanian citizens.

11 years later I was born

It was very important to my grandmother to teach our history and our journey It was very important to my grandmother to teach our history and our journey

When I was eight years old, my grandmother took me to a refugee camp for the first time.

I was puzzled

I didn't understand why it was so important to go there.

When my grandmother held my hand and entered the camp, she said, "Play with the children," and went to visit the women in the camp.

i hated

The kids there are different from me

I was poor and lived in a camp.

if i say no

My grandmother knelt by my side and said firmly, "Go

don't come back until you play

Don't look down on people, don't think you can't learn anything from them."

i reluctantly went

Because I didn't want to disappoint my grandmother.

I played soccer with the kids in the camp and came back a few hours later.

I told my grandma how much fun we had when we left camp and how wonderful these kids were.

When I say in Arabic, "I feel sorry for those children who cannot forgive,"

My grandmother said another meaning of haram: "We are the sinners."

"Don't pity those children, let's trust them as human beings."

It wasn't until I left my native country and came to the United States that I realized the weight of her words.

After college, I applied for and was granted political asylum because of my social standing.

For those of you who don't know, there are countries that still sentence people to death for being gay.

Renunciation of Jordanian nationality

It was the toughest decision of my life, but I had no choice.

So when you experience the choice between homeland and life, the question, "Where is home?" can be heartbreaking.

A woman I met in a refugee camp in Greece recently described it so beautifully when she realized she had to flee Aleppo.

"I look out the window and see nothing.

it was all rubble

No shops, no roads, no schools, everything was gone.

I spent months in my apartment listening to bombs being dropped and watching people die.

But I knew that one day things would get better and I wouldn't be kicked out or robbed of my home.

For some reason I looked outside that morning and realized that if I didn't leave, my three young children would die.

so i left

I left because I had to, I didn't want to.

I had no choice," she said.

It's hard to feel like you belong when you're homeless, when you're rejected by your country of birth because of fear or persecution, or when the city you grew up in is completely destroyed.

I didn't feel like I had a hometown

I'm no longer a Jordanian citizen, and I'm no longer an American.

I felt a kind of loneliness, a feeling I still can't describe

After college, I desperately wanted a place to call home.

I moved from state to state in the United States and ended up in North Carolina.

Kind people took pity on me, offered to pay my rent, provided me with food and a suit for my job interview.

But that only left me feeling alone and helpless.

When I met Miss Sarah — the Southern Baptist woman who took me through my rock bottom and gave me a job — I finally believed in myself.

Miss Sarah ran a diner in the mountains of North Carolina.

Clearly, I came from an upper-class upbringing and graduated from a prestigious women's college, so I assumed I was being hired as a restaurant manager.

but it was different

I started washing dishes, then I cleaned toilets and worked in the kitchen.

I humbled myself and learned the value of hard work.

Most importantly, I felt respected and accepted.

I celebrated Christmas with Sarah's family, and Sarah experienced Ramadan with me.

I was very nervous when I came out to her. Sarah is a Southern Baptist.

I sat next to Sarah on the couch and said, "You know I'm gay."

Sarah's reply was unforgettable

"I don't mind that, but don't be shy."

(Laughter) (Applause) I ended up moving to Atlanta, but I was still searching for my hometown.

Three years later, my life took a strange turn after I met refugee children playing soccer outside.

I took a wrong turn and wandered into an apartment building and saw kids playing soccer outside.

Barefoot, with a tattered soccer ball, lined with stones for goals.

After watching the kids for about an hour, I was smiling.

because it reminded me of my hometown

It reminded me of my past when I grew up playing soccer, on the streets of Jordan with my brothers and cousins.

I eventually joined the children's game

The kids let me in with a bit of a dubious look on their faces.

but i think i know

When I asked the kids if they ever played soccer with a team,

I don't have it, but I want to do it

I persuaded them to form my first team.

Working with children was my training in being a refugee, in poverty and in humanity.

Three brothers from Afghanistan, Rullah, Nullah and Zabila, were the main force of the team.

One day, I went to practice late and there was no one on the court.

i got worried

We are a team that loves to practice.

Skipping practice isn't like a team.

As I got out of the car, I saw two kids running out from behind a garbage container, waving frantically.

"Coach, it's hard. Lou got knocked out.

There was blood everywhere."

"What do you mean by hard?"

"The bad guys hit Lou.

Everyone got scared and ran away."

We drove to Lou's apartment.

I knocked on the door and Noor opened it.

"Where's Lou? I want to make sure he's safe."

"He's in his room, he doesn't want to come out."

I knocked on my room door

"Lou, come out. I have something to talk to you about.

I have to see if I have to go to the hospital."

Lou came out

He had a big abrasion on his head, a cut lip, and he was shaking.

I looked at Lou and told him to call his mom because I needed to take him to the hospital.

mom called

came out

I turned my back on her and she started screaming in Persian.

the children were rolling on the ground laughing

I was confused because there was nothing funny about it.

According to the children, the mother said, "Isn't the coach a Muslim woman?"

He didn't look like a Muslim or a woman from behind.

(Laughter) I turned around and said, "I'm a Muslim."

"(Persian) There is no god but Allah," chanted the Islamic confession

Confused, and perhaps somewhat certain, my mother realized that I was indeed a Muslim, in shorts with an American demeanor and without a veil.

This family fled the Taliban.

Hundreds of villagers were killed

My father was taken by the Taliban, and when he came back months later, he was a husk.

The family fled to Pakistan, where the older boys, then eight and 10 years old, worked 10 hours a day weaving carpets to support the family.

We were all thrilled when we found out that immigration to the United States had been approved.

It's like winning the lottery

it's not uncommon

Every refugee family I've worked with has a history similar to this.

The children I worked with saw their mothers raped and their fathers' fingers cut off.

One kid saw a bullet go through his grandmother's head because she refused to let the rebels take her grandson as a child soldier.

their journey is heartbreaking

But what I find every day is hope, resilience, determination, love of life, and gratitude that I can rebuild my life.

One night, I was at the boys' apartment, and after cleaning 18 hotel rooms, my mother came home.

As she sat down, Nuer rubbed her leg and told her that when she graduated, she would take care of her mother.

she smiled weary

"God is good Life is good Blessed are we here"

Over the last two years, we've seen anti-refugee sentiment grow.

It is now a global trend

Refugees continue to grow because we are doing nothing to stop them.

We shouldn't stop refugees from moving to this country.

Refugees should not be forced out of their homelands.

(Applause) Excuse me.

(Applause) How much more pain do we have to —

How many people must be forced out of their homeland before "enough is enough"?

100 million people?

Refugees have nothing to do with atrocities, yet we not only insult them, condemn them, reject them, but hurt them again when they should be welcomed into our country.

We deprive refugees of their dignity and treat them like criminals.

I called a student into the faculty room a few weeks ago.

she was from iraq

she broke down crying

"Why do you hate me?"

"Who hates you?"

"Everyone hates us because we are refugees and we are Muslims."

Before, I could reassure my students that the majority of people don't hate refugees.

But this time I couldn't

I couldn't explain why the child's mother was about to be stripped of her hijab while shopping, and was called a terrorist by an anti-refugee group and told to go back to her home country.

I couldn't reassure him by saying, "Your father has devoted his life to working as an interpreter in the U.S. military, so you are a worthy American citizen."

We accept few refugees in the world

1 in 1000 can be resettled

That 0.1% brings more value than it gives.

I am stunned when the word "refugee" is treated as something dirty and shameful.

they have nothing to be ashamed of

We see progress in every aspect of our lives, except in humanity.

65.3 million people have been displaced from their homes so far because of war, the highest number in history.

Shame on us

thank you

(applause)

I would like to offer you a new perspective.

It's grandiose, but it's true.

Yesterday morning I left Ireland

I traveled alone from Dublin to New York.

But the design of airports, planes and terminals makes it difficult for a 105.5 cm tall person to travel on their own.

105.5 cm is 3 1/2 feet in America.

At the airport, I was put in a wheelchair pushed by airline staff.

I don't need to use a wheelchair, but the airport's design and lack of accessibility forces me to use a wheelchair.

With my carry-on bag between my legs, I wheeled through security and pre-clearance to the boarding gate.

At airports, I use accessibility services because most airport terminals weren't designed with people like me in mind.

For example in security

I can't get my carry-on bag off the floor onto the conveyor with my physical strength.

the conveyor is at my eye level

For security reasons, I can't ask the staff to help me or do it on my behalf.

Design interferes with my autonomy and independence.

But traveling at my height isn't all bad.

The legroom is the same as in business class even in economy.

(Laughter) I often forget that I'm short.

What reminds me of that is the physical environment and society.

Using a public restroom is an excruciating experience.

Even if I enter a private room, I can't reach the door lock.

Because I'm an original and undaunted person

Look around and look for a trash can that can be turned over.

As for safety

not good at all

What about hygiene?

no good at all

other options are worse

If it doesn't work out, I'll use my smartphone

And then I can reach four or six inches higher, so I'm going to use my iPhone to push it and try to lock it.

Jonathan Ive probably didn't have this kind of usage in mind when he designed the iPhone, but it works.

As an alternative to those who don't know

He apologizes profusely and asks him to stand outside the door of his private room and look after him.

You can do it, and I'm grateful, and I hope you don't realize I left the bathroom without washing my hands, as I feel utterly humiliated.

I carry hand sanitizer with me every day, because sinks, soap dispensers, hair dryers, mirrors are all out of my reach.

Accessible restrooms seem like a small option.

There you can reach your door locks, your sink, your soap dispenser, your hair dryer, your mirror.

I still can't use the toilet

The toilet seat is intentionally designed to be high so that wheelchair users can easily reach it.

This is a wonderful and much-needed innovation, but what does it mean in the world of design to describe new projects and innovations as "accessible"?

Who is it easy to use?

And whose needs are being overlooked?

Now, toilets are an example of how design undermines my dignity. But the physical environment influences me in ways that are very close to me, such as the simple things like ordering a cup of coffee.

let's confess

i drink too much coffee

The skinny vanilla latte is my usual order, but I try to use less syrup.

But my favorite coffee shop is poorly designed, at least for me.

As you stand in line next to a case of cake, the barista calls out the next customer.

"Next person please!"

they can't see me

People in line behind me point at me and everyone gets embarrassed

I will finish the order as soon as possible and go pick up the coffee.

please think about it

where is the coffee

It comes out without a lid all the way up

It's incredibly dangerous to reach for the coffee you bought yourself.

Design influences the clothes I want to wear.

i want my clothes

But you can't find clothes like that in the children's clothing store.

And most of the women's clothes have to do a lot of alterations.

I want shoes that represent me as mature, professional and sophisticated.

But they recommend sneakers with Velcro that light up when you walk.

I never hate shoes that light up when I walk

(Laughter) But design can also influence something as simple as sitting in a chair.

You can't move gracefully from standing to sitting

The height of the chair design is to a standard, so you have to use your hands and knees to climb up to get on the chair, and you're always ice cold to keep it from tipping over.

But while design influences me, whether it's a chair, a toilet, a cafe, or a piece of clothing, I rely heavily on the kindness of strangers to support me.

Of course not everyone is good

I'm reminded of my short stature when strangers point fingers, stare at me, laugh at me, call me names, take pictures of me.

this is a daily occurrence

The rise of social media has given me the opportunity and the platform to speak out as a blogger, as an activist, and at the same time, I'm nervous about being turned into an online joke without my consent, or going viral and controversial.

So let's make one thing clear here and now

The word "dwarf" is discriminatory

The term evolved from circuses and freak shows in the days of P.T. Barnum.

society has evolved

our vocabulary should also develop

language is a powerful tool

Language doesn't just give our society a name

shape our society

I'm very proud of being a little person — I inherited achondroplasia through genetics.

But I'm most proud to be Sinead.

Achondroplasia is the most common form of dwarfism

Achondroplasia means "no cartilage formation."

I have short limbs and a characteristic achondroplasic facial expression, as well as my forehead and nose.

I can't straighten my arm, but I can lick my elbow

I won't show off

Achondroplasia occurs in approximately 1 in 20,000 people.

80% of short people are born to normal height parents.

So anyone here is a potential parent to a child with achondroplasia.

But in my case, I inherited it from my father.

let me show you a picture of my family

My mother is of average height, my father is short, and I am the oldest of five children.

i have three sisters and one brother

All my siblings are of average height

I was very fortunate to be born into this family, where curiosity and perseverance were nurtured, and this allowed me to protect myself from the unkindness and ignorance of strangers. It gave me a weapon of resilience, ingenuity, and self-confidence that allowed me to thrive in my physical environment and in society.

If there's one reason for my success, it's that I was and was a beloved child. Now I'm a beloved petty cynic.

I want to give you a new perspective so that you can see who I am now.

I challenge the idea that design is merely a tool to create functionality and beauty.

Design has a huge impact on people's lives, everyone's lives.

Through design, we feel a sense of belonging to the world, but through design we can also protect human dignity and human rights.

Design can also impose weaknesses on groups of people whose needs are not considered.

So today, I want you to question your own perceptions.

For whom is design forgotten?

How can we get their voices and experiences delivered?

What's next?

Design is an even greater responsibility than it is a great privilege.

Everyone please open your eyes

thank you very much

(applause)

it's time to talk

relax let's get started

Once upon a time, a mother duck was patiently warming her eggs, waiting for them to hatch.

One day there was something moving under my stomach

Paki Paki!

The mother happily watched as the eggs hatched one by one.

I don't know about you, but when I was little, story time was my favorite part of the day.

When my two sons were young, I loved reading to myself.

During this special time, parents and children can engage in storytelling together, immersing themselves in tales of magical kingdoms, wondrous beasts and baby ducklings that become swans.

Some kids are like that, and some kids aren't because they don't have a parent nearby to read to them.

let's talk about sophie

Sophie is five years old and lives with her parents.

One day there was a loud knock on the door

I hear yelling, I hear my mother cry

My father was taken away by the police.

Sophie got scared and started crying too.

It's been weeks

Sophie doesn't know what happened to her father.

If you ask your mother, she will get angry.

so i stopped listening

Sophie waited

I miss my dad so much

I run home from school every day to see if my father is home.

There are many nights when I'm tired of crying and sleep

Kids started teasing me at school

I'm being fingered

Someone's mother heard that Sophie's father is in prison.

To avoid going to school, Sophie feigned illness.

Teachers at school don't understand why Sophie is late in her studies.

After an awfully long time for Sophie, a letter arrives.

It's a letter from my father

the handwriting was messed up

Mother cried after reading the letter, but she read it to Sophie a little bit.

The letter said that the father was fine and wanted to see the two of them.

very short letter

Sophie says she wants to see her father wherever he is.

Mom says she doesn't have the money to go see her because it's too far away

Then one day the phone rang

"Sophie, talk to your father."

Dad's voice sounded like someone else, far away

Dad said he couldn't talk too long and seemed to be on the phone in a noisy place.

Sophie didn't know what to say

It's a common story, but it's not a very good story.

In Britain, 200,000 children feel embarrassed and lonely because of their parents in prison.

200,000 people

That's more than the number of children affected by their parents' divorce each year.

And children of prisoners can be deeply affected.

You're three times more likely to have problems in school or suffer from a mental illness.

In so many ways, children are the unwitting victims of their parents' crimes.

And in so many ways, children are the invisible victims of their parents' crimes.

Until last November, I was a prisoner, serving time for fraud.

I cheated and paid the price

Before that, I was a solicitor for 30 years.

I had a happy and stable childhood, a good education, a happy marriage, and fortunately it's still going.

I have two grown sons

I tried to spend as much of my sons' childhood with them as possible.

I watched carefully what my sons did.

I read to them every night, and ironically, my favorite was "The Tale of Droboville."

(Laughter) But as soon as I got out of prison, it became clear that my background was very different from most prisoners.

Few had a decent education

For many, education was associated with humiliation and failure.

I can tell you from experience that prison is a dehumanizing place.

Convicts become rigid, they close their minds, they withdraw.

to survive

This is a big shock to the family.

In fact, it can be very difficult to keep in touch with your family while you're in prison.

Even if a child is able to see their parent in prison, they must undergo a body search just like an adult.

Like adults, they go through metal detectors and are checked by drug-sniffing dogs, because some children are unknowingly given drugs and cell phones.

Even if you manage to meet your parents, you may be tired from the long journey and squirm, keep your mouth shut, or start crying.

If your parents don't get along, it's not easy for them to visit you.

For these and other reasons, more than half of inmates lose contact with their children and family.

How can we help prisoners stay connected to their families?

While serving time in Channings Wood Prison, I started participating in a charity called Storybook Dads.

Storybook Dads began in 2003, when prison civil servant Sharon Berry found out how many inmates wanted to stay in touch with their children.

So I started using some story books to help record prisoners' stories and send them to children.

Ideas like this are often not new.

that's a great idea

But it was an instant success.

You may be wondering, how do we record stories in prison?

Is it difficult for prisoners?

Will it be difficult?

The process of choosing stories, reading them and recording them can be very difficult for prisoners.

Prison is a harsh place, and prisoners have no room to show weakness or vulnerability.

But the process of recording can be uncomfortable, upsetting, and sometimes overwhelming.

some people cry often

Crying is the regret of overlooking the growth of my child

Feeling ashamed of having let your family down

It's also because I don't know how to read to my child.

But because we do it privately, one-on-one, inmates don't need to be tough, but rather use their vulnerability as a strength to connect with their children.

I remember one prisoner who came to record.

He was a big, grumpy man with a reputation for being tough.

He showed up with a more merciless look than usual, but

As soon as the door to the recording room closed, the facade began to crumble.

He took a crumpled piece of paper out of his pocket and quietly began to read a message to his two young children.

my hands were shaking

Then, in a surprisingly gentle voice, she began singing her child's favorite lullaby.

There's not much you can do from inside prison to show your child that you miss them and love them.

I could do this

Once it's recorded, it's sent to the Storybook Dads editing room at Channings Wood Prison in Devon.

i worked there

I was trained, along with other prisoners, to edit and produce recordings sent from prisons all over England.

Use audio and video editing software to remove misspelled words from recordings, add sound effects and music.

The experience and skills learned here will help prisoners find jobs in the future.

When the audio is finished, we transfer it to CDs and DVDs and send it to the family, so that the children can see it whenever they want.

Children listen and watch audio and recordings over and over Before going to bed or in the car...

Some kids even bring it to school to show it to their friends.

These things let children know that their parents love them and want to see them.

These things help inmates know that as parents they can do something for their children.

back to Sophie

One day, just before Christmas, a package arrived, and it contained this.

Let's listen together

(Video) Santa: Comet! Cupid! Blitzen to the donor!

Charlie: You mean the reindeer?

Santa: Yes it's a reindeer

Flying higher and higher, over the land and the sea

Pass by the magical Aurora Borealis - wouldn't you like to see the Northern Lights?

Charlie: It must be like this snowman's belly.

Santa: Maybe

Cool snowman, right?

Charlie: cool, very nice

Santa: I went around the world to visit children and delivered presents to each one.

I'm back in Frog's Bottom faster than I can see

(Charlie laughs) Santa: Are you funny?

Charlie: I want to live in Frogsbottom too!

Santa: Where do you live? Frogsbottom tree?

Charlie: No, I live in this tree.

Sounds like Christmas, right?

Santa: nice

It's beautifully decorated

Charlie: Thank you!

(Laughter) Alan Crickmore: Sophie said she saw this three times with her mom and laughed out loud for the first time in a long time.

Sophie knew her dad was doing well and loved his family, and the next time Sophie called, she had a lot to say, "What does Curious Charlie eat?

Will Daddy read to me again? ”

Since 2003, Storybook Dads has continued to grow.

Storybook Dads and Storybook Mumms are now working in over 100 prisons in the UK.

98% of inmates who participated said it improved their relationship with their child.

Since 2003, over 60,000 DVDs and CDs have been sent to children of prisoners.

For Sophie's family and thousands of other families in the same situation, Storybook Dads is a lifeline.

Some inmates say this was the first time they started having relationships with their children.

Some illiterate people seek education to improve their literacy, gaining confidence in what they have accomplished.

Let's go back to the story of the ugly duckling.

But this time, I'm going to listen to a recording made by an inmate, because it encapsulates the power of what we do.

This man was an Irish Traveler who couldn't read or write.

He wanted to give a story to his daughter for her birthday.

Thanks to the help of mentors and good editing, it turned out great.

Here's an excerpt from the original recording, where the inmate repeats phrase by phrase what he hears.

(Recorded) Leader: Nowhere to hide

Owen: Nowhere to hide

Leader: One day I ran away

Owen: I ran away one day.

Leader: He escaped and came to a large moor.

Owen: He escaped to a large moor.

Leader: Where mallards live

Owen: That's where mallards live.

Alan: And here's an excerpt, minus the mentor's voice, plus sound effects and music.

(Recording) Owen: Nowhere to hide

one day i ran away

He ran away and came to a large moor, where mallards live, where he lay for two weeks in a rush bush.

(music) (ducks crowing) Mallards and geese came to see

I laughed at the duckling, saying, "It's ugly."

(ducks croaking) The ugly duckling escaped from the wide moor.

(Ducks crowing) Alan: So this concludes (Recording) Owen: No longer an ugly duckling.

had grown into a beautiful swan during the winter

The other swans saw him and thought how beautiful he was.

"Come with me," says another swan

went together

(Bird sounds) Tiara, I hope you enjoy the story as much as you enjoyed reading it.

I can't wait to meet you and hug you

with love from dad

I love you, I want to see you from the bottom of my heart

see you soon bye bye

(music) (music ends) Alan: He cried when he heard this recording in his cell before it was shipped to his daughter.

It's a common reaction among prisoners, and for the first time in their lives, they realize that they've done something for their children that they never thought they could do.

Through the power of storytelling, parents and children were able to bond in a fundamental way.

And Sophie seems to like the story of "Grafallo" this time.

(Laughter) (Applause)

"Now is the time—" said Thomas Paine. "An opportunity to test the human soul."

we are now being tested

Now is a fateful moment in Western history.

Divided movements in elections and society

Extremism has grown in politics and religion, anxiety, uncertainty, fear, a world that is changing faster than we can bear, and what is certain is that change is still accelerating.

I have a friend in Washington

I asked him, "What was it like being in America during the recent presidential election?"

"Well, it's like, sitting on the deck of the Titanic with a glass of whiskey, 'I know I said I wanted ice (laughs), but that's ridiculous.'" Is there anything we can do? How can each of us face the future without fear?

i think i have

Perhaps one of the easiest ways is to ask the culture and the time period, "What do people worship?"

People have worshiped many things, the sun, the stars, the storms—

Some worship polytheism and others have only one god or no god.

In the 19th and 20th centuries, people worshiped the state, the Aryan race, the communist state.

So what do we worship?

Future anthropologists will probably refer to the books we've read about self-development, self-actualization, self-esteem, and so on.

You'll see how we think about morality, how we think about politics as a matter of self-respect and individual rights, and we'll look at the wonderful new religious rituals that we've created.

Do you know what it is?

It's a "selfie"

And what anthropologists have concluded is that in this day and age we worshiped "self, me, me."

that's wonderful

It's open and empowering, which is great.

But we must not forget that biologically we are social animals.

We've lived in small groups for most of human evolutionary history.

We meet face-to-face, learn to tune altruism, and create the spiritual products of friendship, trust, loyalty, and love that fill our lonely hearts.

When the "I" is too big and the "we" is too small, we find ourselves vulnerable, fearful and lonely.

It's no coincidence that MIT's Sherry Turkle titled her book about the impact of social media "Alone Together."

So the simplest way to protect the future you is to make the future "us" stronger in three ways: our relationship, our identity, our responsibility.

Let's talk about relationships first.

Please allow me to speak privately here.

Once upon a time, a very long time ago I was a 20 year old college student studying philosophy I was a 20 year old college student studying philosophy

I was into Nietzsche and Schopenhauer and Sartre and Camus.

I was filled with existential uncertainty and existential anxiety.

it was nice

(Laughter) I was obsessed with myself, and I was an uncomfortable person to get to know, until one day I saw a girl across the courtyard who was completely different from me.

she shines the sun

was full of joy

I know her name is Elaine

we meet and talk

got married

And now, 47 years later, with three children and eight grandchildren, I can say with certainty that it was the best decision I ever made in my life, because it's the different types of people that make us grow up, because the different types of people make us grow up.

that's why i think i should

The problem with Google filters, Facebook friends and online news is not so much broadcasting, it's narrowcasting, which means that we're surrounded by people who are exactly like us, with the same perspectives, opinions, even prejudices.

As Harvard's Kath Sunstein has shown, if we gather only with people who share our views, we become more extreme.

We should continue these real-life encounters with people who are different from us.

It's necessary for us to realize that we can still be friends even when we have strong disagreements.

Through real-world encounters, we discover that people who are different from us are just as human as we are.

In fact, every time we extend a hand of friendship to someone who is different from us, who has a different class, a different creed, a different color, we are healing one of the scars in our world.

that's who we are in relationships

About Us in Identity

Let's do a little thought experiment

Have you ever been to Washington and seen some monuments?

totally charming

The Lincoln Memorial - On one side of the building is the Gettysburg Address and on the other side is the Second Presidential Inaugural Address.

If you go to the Jefferson Memorial, there's a long text there too.

Martin Luther King Memorial has more than a dozen quotes from his speech

I didn't realize that in America, memorials are meant to be read.

In Parliament Square, London, there's a monument to David Lloyd George, and it's engraved with three words: "David Lloyd George."

(laughs) Two words for "Nelson Mandela"

Churchill only has one word, "Churchill"

(Laughter) Why this difference? I will explain

America has been a land of immigrants from the beginning, so there was a need to create an identity. And that was done by telling stories, which you learn in school, read at memorials, and hear over and over again in presidential inaugural addresses.

Britain wasn't a country of immigrants until recently, so we were able to take our identity for granted.

The problem is that now two things have happened that shouldn't have happened at the same time.

First, the West has stopped telling the story of who we are and why, even in America.

At the same time, the number of immigrants is increasing more than ever before.

When you tell stories, your identity is established and strangers are welcome, but when you stop telling stories, your identity becomes fragile and you feel threatened by strangers.

that's not good

The Jews were exiled for 2,000 years and lived scattered everywhere.

never lost identity

I wonder why? At least once a year, at Passover, we tell stories to our children and eat unleavened hard bread and bitter herbs that taste the bitterness of slavery.

This is how we have kept our identity.

I think we should all go back and tell our stories, tell us who we are, where we came from, and what ideals we live by.

Then we will welcome strangers and be strong enough to say, "Come and share our lives, our stories, our lofty aspirations and dreams."

this is our identity

Finally, about our responsibility

do you know

One of my favorite political theories, and it's very American, is "We the people."

Why "We the People"?

Because it means that we all share responsibility for each other's future.

That's who we are and what we should be

Have you noticed delusional ideas popping up in the political arena?

We think we should choose a strong leader, that he or she will solve all our problems.

it's an illusion

Then we fall into the extremes of thinking: the extreme right, the extreme left, the extreme philistines, the extreme anti-religious, the extreme right dreaming of a golden age that didn't exist, the extreme left dreaming of a utopia that didn't exist, believers and anti-religious alike believe that our salvation depends solely on the presence or absence of God.

It's also an illusion It's us the people who can save us from ourselves Together we all-

Then we move from "me" politics to "all of us" politics and discover the beautiful and counterintuitive truth that nations are strong when they look after the weak, rich when they care for the poor, and truly powerful when they protect the weak.

that is the foundation of a great nation

(Applause) My simple suggestion is

It can change your life, it can change the world

Look in your mind and try to replace the words Look in your mind and try to replace the words When you come across the word "self" replace it with the word "other"

Help others instead of helping yourself Protect the dignity of others instead of self-respect

Then you'll begin to feel the power of turning the words "for me" into the most moving passages in all religious texts.

"Though I walk through the valley of the shadow of death, I fear no evil, for you are with me."

We can face the future fearlessly as long as we know that we will not face it alone.

So let's strengthen the future "us" together for the sake of the future "you"

thank you

(applause)

I like to make tools and let people use them

The first tool I built when I was a kid was a microscope, made with lenses I stole from my brother's glasses.

I wasn't very impressed

Maybe that's why, 30 years later, I'm still building microscopes.

It's for moments like this that I'm building these tools.

(Girl) I have a lot of black in my hair. (Speaker) It's a school in the Bay Area.

(Video voice) The living world is so much more than we can imagine how things work.

(Children) Oh My God!

(Speaker) Yes, "Oh my God."

I didn't realize this was such a universal term.

In the last two years, our lab has made 50,000 Foldscopes and delivered them free of charge to children in 130 countries around the world.

This year, with the support of our community, we're going to send one million microscopes to children around the world.

What happens then?

It creates inspiring communities of people from all over the world to learn and teach from each other, from Kenya to Kampala to Kathmandu to Kansas.

The great thing that I love about this is the sense of community.

A child in Nicaragua teaches other children how to look at mosquito larvae under a microscope to determine if they are the dengue-carrying species.

Pharmacologists have come up with a new way to spot a placebo under a microscope.

A girl who wondered how something glitters

Discovering the world of crystalline physics in brilliance

A doctor in Argentina is using this microscope to test for cervical cancer on the go.

And I myself found a kind of flea that had burrowed an inch into my heel.

You might think that's an exception

But there's a way to make something like that happen.

I call this "frugal science," the idea of ​​sharing not just information, but the experience of doing science.

Think about it, there's a billion people in the world who live with no infrastructure at all: no roads, no electricity, no health care.

And there are 1 billion children in the world who live in poverty.

What can we do to help them become the next generation of problem solvers?

We have healthcare workers on the front lines, fighting infectious diseases with absolutely minimal tools and resources to protect us.

As a Stanford lab, the context in which we think is to use humble science to find solutions for those communities.

I think about how we can make diagnoses under trees without electricity.

Today I'm going to show you two examples of new tools.

One of the origins was Uganda.

Back in 2013, while on a research trip trying to detect schistosomiasis with foldscopes, I realized something.

In one very remote clinic, a centrifuge was used as a door stopper.

It's a literal door stopper

When I asked him why, he said, "There's no electricity here, so it's useless, but it's perfect for a door stopper."

I know some of you don't know what a centrifuge is, but it's an essential tool for sample processing.

It separates blood and bodily fluids into components so that pathogens can be found and identified.

But centrifuges are big, they're expensive -- they cost like a thousand dollars -- and they're hard to get into the field.

Of course it doesn't work without electricity.

It sounds like something you've heard before

So I started thinking about how I could solve this problem, and ever since I got back, I've been thinking about some kind of toy.

Here-

I brought some

I started with a yo-yo

I'm very bad

It's supposed to spin, so I thought, maybe I could use that physical property to make a centrifuge.

I'm not good at it

So when I was exploring the world of toys, I saw it.

It's called Warrigig, Bazaar, Randle, etc.

There are two strings attached to the disc, and when you pull it, it spins.

Anyone played with this as a kid?

It is also called "bun bun sesame"

I think I've played about half of them.

In case you didn't know, this little thing is the oldest toy in human history.

Five thousand years ago

Found in various parts of the world

The irony is that people didn't know how it worked.

I was so excited

So I went to research and wrote some equations.

You should be able to solve it mathematically based on the torque you put in, the resistance of the disk, and the resistance of the string to twist.

This is not the complete set of equations that will appear in this talk.

After 10 pages of mathematical formulas, I was able to write out a complete analytical solution for this dynamical system.

And out of that came Paperfuge.

He's our postdoc, Saad Vermura, and he's the co-inventor of Paperfuge.

On the left is the centrifuge that we're replacing.

And as you can see, it's made up of a disk, two strings, and a handle.

When you turn it, pull it like this and it will start turning.

I did the math, and what I found was that it could theoretically spin up to a million revolutions per minute.

But there's an anatomical limit to the human body, and this one vibrates at about 10 hertz, and if you've ever played piano, you know that humans can't move faster than two or three hertz.

The maximum rotational speed that I've been able to achieve with this is not 10,000 or 50,000 rpm, it's 120,000 rpm.

Centrifugal force is 30,000 G

Imagine how much power you'd experience if you were to stick yourself in this and spin it around.

The point of this tool is that it can be used for diagnostic purposes.

I'm going to give you a quick demo here, so you can see it.

People who don't like seeing blood don't have to

this is a small needle

Available everywhere and completely safe

If you had breakfast today—

this doesn't hurt at all

You put the blood in a small tube, and the blood will tell you the answer, and that's where it gets interesting.

It also tells me if I have malaria in me.

If you look at the tubules, you can see the blood going in.

let's bleed a little more

This is enough

Put the tubule in the clay and seal it.

A blood sample has been sealed.

Attach this sample to Paperfuge

Make a sealed cavity with a little piece of tape.

The sample is now enclosed

ready to spin

pull or loosen

let's build momentum

You can see that it started spinning

Unlike a normal centrifuge, this centrifuge alternates direction of rotation.

Repeat rotation and reverse rotation

Let's go faster. I can see the momentum.

I don't know if you can hear this sound, but if you've been like this for 30 seconds, you've separated the blood cells and plasma.

And by the ratio of blood cells to plasma -- (Applause) -- you've already separated.

This ratio tells me if I'm anemic.

we made different kinds of paperfuge

Now, if you spin it a little longer, it will identify if you have malaria.

Another version isolates the nucleic acid so that it can be tested in the field.

This is another version that can process multiple samples at once. And finally, here's a new one that we're working on that will allow us to run multiple tests in one go.

Sample preparation and chemical analysis can be done in the same platter

Now

That's fine, but it's a valuable tool, so we have to get everyone to use it.

We're just back from Madagascar, and this is a clinical trial for malaria. (Laughter) You can do it over a cup of coffee.

The thing is - this is a village six hours from the main road.

There's a village elder and a medical worker in the room.

This is the most exciting part of my job, this smiling face, being able to share this simple but powerful tool with people around the world.

I forgot to mention that it costs 20 cents to make.

And I'm going to use the rest of my negative time to talk about recent inventions -- (Laughter).

It's called Abuzz, and the idea is to get people to work together to fight mosquitoes, and track them.

Mosquitoes are the enemy because they cause malaria, Zika, chikungunya, and dengue.

The hard part is not knowing where the enemy is.

We don't have a world map to show where the mosquitoes are.

so i started thinking

There are 3,500 species of mosquitoes, and they all look alike.

Some of them are so similar that even entomologists can't tell them apart just by looking at them under a microscope.

But even mosquitoes have an Achilles heel.

This is how mosquitoes are talking

male chasing female

We're actually talking to each other on the frequency of the hum.

(Buzzing) That's how you can identify mosquitoes.

Ordinary $5 to $10 flip phone — how many of you remember what this is?

(Laughter) Now we can record the acoustic properties of the mosquito's wing.

i will tell you how to do

I caught mosquitoes outside

I'm not going to let you go here like Bill Gates.

(Laughter) I'll show you how to record it.

catch mosquitoes and make them fly

Check first, you can actually hear the hum.

I take out my phone, and it has a microphone, and it's good enough to pick up the acoustic signature of a normal phone.

I'm running out of time, so let me hear what you recorded yesterday.

(Mosquito buzzing) It sounds familiar. It's a sound that everyone loves.

And what's great about it is that you can record it with a regular cell phone, so you can make a chart for each type of mosquito.

Using a flip phone, we've created one of the largest acoustic databases of 20 to 25 mosquito species that carry human pathogens.

Using this and machine learning, anyone can upload a recording of their wings and know which species of mosquito it's likely to be.

It's called Abuzz, and anyone who wants to try it can sign up on their website.

Finally, I would like to conclude by saying something very important.

We have a lot of terrible problems today.

We have a billion people without any medical care, climate change, biodiversity loss, and much more.

And we hope science will figure it out.

Before I leave this room today, I want you to promise me one thing.

We're trying to make science accessible to everyone, not just the rich, but everyone else.

Let's make science and scientific skills a basic human right.

As we pass the thrill of discovery to the next child, we can transform them into the people who will solve our problems.

thank you

(applause)

I'm a journalist and an immigrant

These two things characterize me

I was born in Mexico, but I've spent more than half my life reporting in America, a country built by immigrants.

As a journalist and as a foreigner, I've learned that it's not the best policy to be neutral, to be silent, to be afraid.

Under the cover of this neutrality, we journalists often turn our backs on our real responsibilities.

What is that responsibility?

It's about questioning those in power and challenging their legitimacy.

There are reports for this

Questioning power and challenging it is one of the virtues of journalism.

Of course, we also have a duty to tell the truth as it is, not fiction.

In that sense, I subscribe to the principle of objectivity, and if the house is blue, I say it's blue.

If there are a million unemployed, say a million.

But staying neutral doesn't necessarily lead to the truth.

Even if I put both sides of a subject with the utmost caution -- Democrats and Republicans, liberals and conservatives, government and anti-government -- there's no guarantee, and no one can guarantee that, at the end of the day, you'll know what's true and what's not.

Life is much, much more complicated, and the press should reflect that complexity.

I want to make it clear here that I will never become a tape recorder.

I didn't become a reporter to be that kind of thing.

Nobody uses tape recorders anymore?

(Laughter) If that's the case, I'm definitely not going to take out my phone, press record, and hold it out in front of me.

this is not true news

It may come as a surprise to many, but journalists are constantly making value judgments -- ethical and moral judgments.

We're always making extraordinarily individual, highly subjective judgments.

For example, let's say you're asked to cover a dictatorship, like Augusto Pinochet in Chile or Fidel Castro in Cuba.

Do you only report what those commanders want? Or do you stand up to them?

And what if you find out that this is happening, in your own country or in a neighboring country, where students are disappearing and graves are being secretly built, or millions of dollars are disappearing from the national budget, and ex-presidents are somehow becoming billionaires?

In such a case, do you only report the official position?

Or what if you were covering the presidential election of that superpower and a candidate made a racist, sexist, xenophobic remark?

actually this is my story

I'm going to tell you what I did, but before I do, let me tell you what I've been through in my life, so that you can understand why I did what I did.

I grew up in Mexico City, the eldest of five children, because we didn't have the money to send them all to college.

After studying in the morning, I spent my days working in the afternoon.

And finally, I got the job I've always wanted: a job as a broadcast reporter.

it was a big chance

But when I was working on my third interview, I criticized the president and questioned the lack of democracy in Mexico.

In Mexico, from 1929 to 2000, all elections were haphazard, with the sitting president choosing his own successor.

That's not real democracy

I thought it would be great to expose the president's problems, but my boss -- (Laughter) apparently didn't think so.

At the time, the Presidential Palace, Los Pinos, was directly censoring the media.

My boss was in charge of my show, and he was also in charge of a certain soccer team.

I always suspected that they were more concerned with the goals than the news.

my boss censored my report

I asked him to change it, but I refused.My boss changed roles and got another reporter to write the story he wanted me to write.

As a journalist, I didn't want to be censored.

Where did that power come from? I was writing a letter of resignation.

When I was 24 - only 24, I made the hardest and most amazing decision of my life.

I decided not only to leave the television station, but also to leave the country.

I sold my car. I traded my old beat-up red Volkswagen for some money. I said goodbye to my family, my friends, my familiar city, my favorite place, and my tacos -- (Laughter) -- and bought a one-way ticket to Los Angeles, California.

So I joined the ranks of the 250 million immigrants in the world.

If you ask any immigrant, he or she will remember every detail of the day they first entered their new country, as vividly as a movie with background music.

It was getting dark when I landed in Los Angeles, and all I had was a guitar, a suitcase, and a few papers, and I could carry it all with two hands.

I've never felt so absolute freedom as I did then.

I managed to survive with what little property I had

I got my student visa, I was studying at the time.

I ate a lot of lettuce and bread because that was all I had.

And in 1984, I finally got my first job as a broadcast reporter in America.

The first thing I noticed was that in the United States, when a colleague brutally criticized then-President Ronald Reagan, nothing happened.

I thought this country was the best

(Laughter) (Applause) So, for more than 30 years, I've been able to report really freely, and I've been treated equally, even as an immigrant.

On June 16, 2015, the candidate who would eventually become the president of the United States said, "Mexico immigrants are criminals, drug dealers and rapists."

i knew he was lying

I knew he was wrong for one very obvious reason: I'm a Mexican immigrant myself.

we are not like that

So I did what any journalist would do: I handwritten a letter to the candidate asking for an interview, and I sent it to his tower in New York.

I was at work the next day when suddenly my cell phone was bombarded with hundreds of calls and text messages, some insulting.

As the situation got more difficult to swallow, a friend walked into my room and said, "They put your cell phone number on the Internet."

it was exactly

Here is the published letter, which also has my number on it.

It's no use taking notes, I've already changed my number

(Laughter) I learned two things here.

One, under no circumstances should you ever give Donald Trump your cell phone number.

(Laughter) (Applause) The second thing is that we should stop being neutral.

Since then, my mission as a journalist has changed.

I stood up to the candidate and tried to show him that he was wrong, that he was wrong about what he said about immigration in America.

let me introduce some numbers

97% of illegal immigrants in America are good people.

Serious Crime Less than 3% of Americans commit a felony.

By contrast, only 6 percent of American citizens commit this felony.

So illegal immigrants are much better behaved than American citizens.

Based on this data, I made a plan.

Eight weeks after my cell phone number was exposed, I got clearance for a press conference that the candidate was holding to kick-start the vote.

I decided to confront him and do so in person.

but-

Things didn't go as planned. See here [Donald Trump press conference in Dubuque, Iowa] (Ramos) Mr. Trump, I have one question about immigration.

(Trump) Who's the next questioner? Yes please (Ramos) Your immigration policy plan is a pipe dream.

(Trump) It's not your turn to sit down.

(Ramos) I'm a reporter. As an immigrant, as an American citizen, I have the right to ask questions. (Trump) No no (Ramos) I have the right to-

(Trump) Go back to Univision

Ramos: The question is, you could deport 11 million people.

It is also possible to build a wall that spans 3,000 km

Nor can we deny the citizenship of children born in this country.

(Trump) Sit down (Ramos) With those thoughts— (Trump) It's not your turn.

(Ramos) As a journalist to me, please don't touch me.

(Guard 1) Don't interfere. You are interfering.

(Ramos) I have the right to ask— (Guard 1) Quiet. It's my turn.

(Guard 2) Media credential?

(Ramos) I have rights— (Guard 2) Where are you? Show me (Ramos) It's there.

(Male) Please step back.

(Guard 2) Anyway, keep your turn

(Male) You're so rude. It doesn't matter to you.

(Ramos) It's none of your business - (Man) Get out of my country

(Male) It doesn't matter to you. (Ramos) I'm an American citizen too.

(Male) It's enough, I'm going to Univision. It's nothing to do with you.

Ramos: You say it doesn't matter, but it's America.

(Applause) (Applause stops) My first thought every time I watch this video is that hate is contagious.

The cue here is the candidate saying, "Go back to Univision."

One of his cronies says, "Get out of my country!"

I've watched this video over and over again, and the other thing I think is that to break free from the spell of neutrality -- to truly be free -- you have to stop being afraid and learn to say "no."

i don't sit

I won't leave this place

The word "no" is -- (Applause) "no" is the most powerful word in any language.

I think there's a lot of dignity in that, and it creates a deep respect that allows you to take a step back and push back and say, "No."

Elie Wiesel, a Holocaust survivor and Nobel Peace Prize laureate who sadly passed away not long ago, left us with some very thoughtful words: "You have to take a stand.

Being neutral only serves the oppressor, not the victim."

he's right

In certain circumstances, journalists have a duty to take sides. Neutrality and indifference must be set aside when it comes to racism and other forms of discrimination, corruption, public lying, dictatorships and human rights.

One Spanish word sums up the attitude a journalist should take.

It's "contrapoder"

Journalists should basically stand in opposition to those in power.

Because if you collude with politicians, or go to the governor's son's christening or wedding, or want to be with the president, how can you criticize them?

When it comes to interviewing someone of power or influence, I always keep two things in mind.

I don't need to impress people, I don't need to build relationships.

If I had to choose between being the president's friend or enemy, I would always choose to be his enemy.

Finally, I would like to say that immigrants and journalists are in trouble right now, but there's never been a time when we need journalists who are ready to give up their neutrality more than now.

For myself, I feel like I've spent my life preparing for this moment.

Being censored at 24, I learned that neutrality, fear, and silence are often complicit in crime, abuse of power, and injustice.

It's never going to be good news if you're complicit in power.

Now, at 59, my only wish is to retain some of the courage and innocence I had when I was 24 and never keep my mouth shut.

thank you

(Applause) Thank you.

(applause)

First, let's look at a picture of the Earth.

the earth is really beautiful

I'm a geologist, so when I see this, I get a kick out of it, but the Earth is great anyway.

powerful, dynamic and ever-changing

really great place for creatures

What I want to share with you today is my view, as a geologist, that understanding our planet's past can help inform and guide us in making decisions about how we can live on this planet in a sustainable way.

A lot of amazing things are happening on the surface of the earth.

I'd like to zoom in a little bit here and talk a little bit about one of the things that's happening on the surface of the planet.

Matter is constantly moving near the surface, but one of the big things is the transport and deposition of clastic material, which is the result of the erosion of high mountains, to the ocean floor.

This process is ongoing and has a huge impact on shaping the landscape.

For example, here in [North] India, we have some of the largest mountains in the world, and you can see it in this satellite image, and the rivers carry the debris from the mountains to the sea.

These rivers can be compared to bulldozers.

Because rivers basically cut through mountains and carry them to the sea.

Let's see an example here

zoom in a little

I would like to tell you about a river

Here we see beautiful patterns made by rivers that carry clastics to the sea, but these patterns are not static.

Small or big changes in the flow path can have a big impact on our lives.

An example of this is the Koshi River.

The Koshi River has this beautiful C shape, and before it passes through the great mountains of Nepal, it's carrying a lot of clastic material -- a lot of sediment from eroding high mountains -- and it's carrying it all over India.

I'm going to zoom in on this area and tell you a little bit about what happened on the Kosi River.

It's an example of how river systems are constantly changing.

This is a satellite image taken in August of 2008. This satellite image has been colorized so that plants and plants appear green and water appears blue.

As you can see, it's still a C-shaped channel out of Nepal.

This is an image of the monsoon season

August is the monsoon season in this region, and anyone who lives near a river is not immune to floods, or at least the dangers and inconveniences associated with floods.

What happened in 2008 was particularly interesting, because the way this river moved was very different from what it usually does.

You could say that there was a completely different kind of flooding.

The Kosi River flows through here, but because these rivers carry sediment, they sometimes become clogged, and these clogs can dramatically change the course of the river.

This satellite image is from just two weeks later.

Here you can see the old river channel, the C-shaped channel, but it's not blue anymore.

Now there's a blue channel here running down the center of the image.

So the Kosi River broke its banks, and for reference, this scale bar is about 60 kilometers long.

The Kosi River suddenly moved more than 50 kilometers.

The river was clogged and the bank collapsed.

This is an image from about a week later, and here you can see the former course of the river, but you can see that the river is still undergoing a process of diversion, moving further and further away from its former main course.

As you can imagine, it's very important to understand when, where, and how these changes occur in terrain like this, where the course of a river is constantly shifting.

This kind of thing happens all around us

In America, most of the rainwater that falls on the continent drains into the Mississippi River.

The Mississippi River carries debris from the Rocky Mountains and Great Plains.

It transports waste water and debris from anywhere in the United States and discharges it into the Gulf of Mexico.

This is the course of the Mississippi River as we know it today, but it didn't always flow in this direction.

Using the geological record, we can reconstruct past flow paths.

For example, in this red-tinted area, we know that the Mississippi River flowed about 4,600 years ago, depositing clastic material.

And about 3,500 years ago, the Mississippi River moved and flowed through the watershed shown here in orange.

and continue to move

This is about 2000 years ago 1000 years ago 700 years ago

And it wasn't until very recently, 500 years ago, that it began to flow through the watershed we know so well today.

These processes of migration are very important, especially this delta, where the rerouting of the Mississippi River creates new land at the land-sea boundary.

This has become very valuable real estate, and deltas like this are among the most densely populated areas in the world.

Understanding these geomorphic changes -- how they formed and how they will continue to change -- is very important for the people who live there.

The course of the river may change slightly

So far, I've been talking about large-scale rerouting of rivers.

I'm here to talk about small-scale movement of channels.

We fly to the basin of the Amazon Basin, which also has a large river system that drains the Andes Mountains and scrapes debris across South America and into the Atlantic Ocean.

If you zoom in here, you can see a nice undulating channel.

It's very beautiful, but it's also not permanent.

Flow path is changing little by little

You can actually see how it's changing using satellite imagery from the last 30 years or so.

Look at any bend in this river for a moment.

It changes the flow, develops, and transforms the pattern.

If you look specifically at this area, you'll notice that it's completely separated from the main stream, creating a loop of waterway.

It's like whipping a whip, and at some point the river splits.

For your information, here again, the course of the river changed over 6 kilometers in one or two seasons.

Our landscape is constantly being transformed as the debris from eroded mountains is carried out to sea.

It's constantly changing, and by understanding these processes, we can live successfully on this planet in a sustainable way.

But it's very difficult to understand if you only have information about what's happening on the surface of the Earth right now.

May I? Not much observation data

For example, we only have 30 years of satellite imagery.

We need more observational data to better understand these processes.

What we also need to know is how the landscape will respond to climate change and changes in land use as we occupy and modify it.

This is where the usefulness of rock becomes apparent.

As the rivers flow and the debris from the erosion of the mountains is transported to the sea, sometimes a little bit of sand, clay or gravel stays on the riverbed.

The retained material settles in riverbeds and over the years forms large, thick sediments that eventually turn into rocks.

What this means is that if you go to a place like this and see large, thick piles of sedimentary rock, you can go back in time and see what the land was like in the past.

This is a useful way of reconstructing terrain and understanding how it evolved.

At the same time, it's very convenient, because the Earth has had an epic history, right?

This video reconstructs the paleogeography of the last 600 million years of Earth's history.

reproduced very briefly here

We know that as the plates moved, the climate changed and the sea level changed. If we go back in time, we can see that there were different geographies and natural environments.

As an example, let's look at a particular era in Earth's past.

About 55 million years ago, there was a really rapid warming, and what happened was that a lot of carbon dioxide was being released into the atmosphere, causing a rapid and extreme global warming.

And when I say warm, it's so warm that we've seen crocodiles and palm trees all the way from Canada in the north to Patagonia in the south.

It's been a very warm time, and it's really suddenly warmed up.

We can go back in time and find rocks that were deposited during this period to reconstruct the changes in landforms caused by global warming.

yay i see rocks here

(Laughter) So many rocks piled up.

This yellow part is a fossilized river that was deposited 55 million years ago in the environment shown in this model.

We geologists can visit the site and examine these in detail and reconstruct the terrain.

here is another example

This yellow part is the fossilized river

there's another one on top

We go to the site, we look at the details, we measure it, we observe it, we measure the characteristic values.

For example, from the features just shown, we can infer that this river was probably about 90 centimeters deep.

If you were to take a walk through the world 55 million years ago, you could walk across this pretty stream.

The red areas above and below the river tracks are ancient soil deposits.

By examining this, we can learn what life forms lived and thrived here, and we can understand the relationship between rivers and the floodplains they create.

If you look closely, you can identify and reconstruct some of the way rivers and landforms used to be.

If you look at this particular location at this time, if you look at this particular location at this time, before the sudden warming, the river would have meandered from the mountains to the sea, similar to the Amazon Basin you saw earlier.

But as soon as climate change sets in, rivers change dramatically.

All of a sudden, the river widened, and it began to drastically change its course across much of the region.

The river eventually returned to what it was before the climate change, but the river eventually returned to what it was before the climate change, but it took a very long time.

By doing these reconstructions, we can go back in time geologically and understand how the landforms have changed under the influence of climate change and human land use.

Part of the way rivers change, and why they change their flow patterns and movements, is explained by the increased amount of rainfall that falls on the surface of the earth as a result of warming.

After all, as long as we live on the surface, we need to carefully manage the resources and the risks that come with living in a dynamically changing environment.

The only way to do it sustainably is to use information about how landforms have evolved and changed in Earth's past.

thank you

(applause)

A few years ago I heard an interesting rumor

The president of a pet food company brought dog food with him when he attended the annual shareholders' meeting.

they were eating it

You wanted to convince your shareholders that it would be good enough for your pet to eat.

This strategy is now called "dogfooding" and it's a common practice in the business world.

It's not about everyone eating dog food, it's about business people using their own products to demonstrate their confidence in their products.

Now, this is a common practice, but what's really interesting is that this is not the case. Sometimes companies and employees don't use their own products.

It's become commonplace in the technology industry that's involved in electronic screens.

When Steve Jobs launched the iPad in 2010, he described it as an "extraordinary" device.

"Provides the best web browsing. Much better than laptops and smartphones."

It's a great experience."

A few months later, Jobs was interviewed by a New York Times reporter and had a lengthy phone call.

At the end, the reporter asks a simple question.

“Your kids will love the iPad, right?”

I already knew the answer, but the reporter was stunned by Jobs.

No wonder he was astonished, he said, "The kids aren't using it.

We limit the amount of time we use technology.”

This is very normal in the technology industry.

In fact, at the Waldorf School of the Peninsula, a school right in Silicon Valley, people don't use computers until eighth grade.

And what's really interesting is that 75 percent of the kids who go to that school have parents who are executives of some of the best tech companies in Silicon Valley.

When I heard this story, I was both amazed and intrigued, and I began to think deeply about how electronic screens are affecting me, my family, the people I love, and the world at large.

So for the last five years, as a professor of business and psychology, I've been studying the impact of screens on our daily lives.

I'd like to start by looking at how much time is being spent on the screen, and I want to talk to you about how that time is spent.

So what I'm showing here is the average usage of a 24-hour workday over the past three time points: 10 years ago, in 2007, 2015, and just last week, the data we collected.

Actually, for the most part, it hasn't changed that much.

I get about seven-and-a-half to eight hours of sleep per day, and some people say it's getting a little less, but not much has changed.

Working hours are 8.5 to 9 hours a day.

Then there's the so-called survival time, which is about three hours a day for eating, bathing, taking care of the kids, and so on.

This white part minus that

it will be personal time

It's a very precious time for us.

It's time to do things and be yourself

Use this time to pursue hobbies, connect with others, reflect on life, engage in creative activities, and even take a step back and reflect on your life to see if it's been meaningful to you.

At times, work allows you to be yourself, but for those of you who, near the end of your life, look back and think about how your life was going, what you'll be talking about is what happened in that white individual's time.

That's why that time is sacred and important.

Well, from now on, let's see how much of this time is being taken up by the screen over time.

That's it for 2007

Apple released the first iPhone that year.

8 years later, that's about it

That's it for now

This is the only part of my free time that I spend in front of a screen.

Time for something nice to come out of this yellow strip

It's time to be human

it's so small now

So what do we do?

The first thing to think about is what this red part looks like.

Of course, this screen is wonderful in many ways.

I live in New York, but most of my family is in Australia, so my one-year-old son

Introducing the family through the screen

15, 20 years ago we couldn't do it.

There's a lot of good things about screens, too.

One thing you can do is ask yourself, What is happening at this hour?

By using the app Is your mind and life enriched?

There are apps that help with that

If you're using an app like this, and someone asks you, "How are you feeling now?" while you're using it, you're likely to say, "I'm so good." Whether it's relaxation, exercise, the weather, reading, education or health-related apps.

Each of these apps is used for an average of nine minutes per day.

On the other hand, this app takes you far from being happy.

When I stopped halfway and asked, "How are you feeling?"

Answer "Not so good"

Interestingly, each of these dating, social networking, gaming, entertainment, news, and web browsing apps spends 27 minutes each day.

We spend three times as much time on apps that don't make us happy.

I don't think you're very smart

One reason we spend so much time on apps that make us unhappy is that it's never ending.

In the 20th century, there were opportunities everywhere to quit.

incorporated into anything

When you have a reason to stop, you realize it's time to move on, to do something new, something different.

For example, in the case of a newspaper, at some point, when it reaches the last page, you fold it up and put it away.

The same goes for magazines and books, and when you come to the end of a chapter, you wonder if you want to continue reading.

Even if you're watching a TV show, it'll eventually end, and you'll be put on hold until the next one a week later.

Everywhere there was a reason to quit

But with the way we interact with the media today, there's no reason to stop.

New information keeps coming in, everything is bottomless Twitter, Facebook, Instagram Emails and short messages News, etc.

And when it comes to other sources of information, you look endlessly.

There are hints in Western Europe about what to do, and there are a lot of great ideas being adopted in the workplace.

I'll give you one example from the Netherlands, this is an architectural firm.

Here the desk is hanging from the ceiling

Every day at 6 o'clock, no matter who I'm texting or what I'm doing, my desk goes up to the ceiling.

(Laughter) (Applause) So the space that's freed up is now a yoga studio four days a week and a dance club one day a week.

Where you go is up to you

It's a good rule to tell you when to stop, because at the end of the day everything is useless and you can't do your job.

German automaker Daimler has another secret.

When you go on vacation, instead of saying, "My representative is on vacation, I'll get back to you later," instead of saying, "Your email has been deleted because your representative is on vacation.

The person in charge will never see the email I mentioned earlier.”

(Laughter) "Please email me again in two weeks or email someone else."

(Laughter) So -- (Applause) You know what?

When you say you're on vacation, you're really on vacation.

The people who work for this company can really take a break from work.

But of course, with just this, I don't know how to spend my days at home.I would like to make some suggestions.

It's easy to say, "Don't use your cell phone between 5 and 6 in the evening."

The problem is that we spend our "five to six" hours differently on different days.

Actually, there's a better way. Every day, there's something you have to do.

Sometimes I'm alone, sometimes with other people, sometimes in a restaurant, sometimes at home.

Keep your phone far away, as far away as possible

Humans are easily succumbed to temptation

Every time dinner starts, the way I throw my phone away will be your last stop, and together we can all overcome temptation.

It's painful at first

I have a lot of FOMO (fear of being left behind)

(Laughter) I suffered.

But eventually you get used to it

Just like quitting drugs, once you overcome withdrawal symptoms, there's a world that's more colorful, richer, more interesting, and the quality of your conversations will improve.

You can connect deeply with the people you share the space with

It's a great strategy. We all know it works.

They liked it so much that they started doing the same thing every morning for the first hour after waking up.

I put my phone in airplane mode on weekends.

That way you can turn off the phone function and still use it as a camera.

It's an idea that works really well, and it makes people's lives easier every day.

Well, I wanted to tell you-

I said screens are great, and I think that's true.

But we use the screen as if we were sprinting down a long stretch of road, almost like we're pushing hard on the accelerator in a car and it's hard to put our foot on the brake pedal.

you can choose here

You could just glide past a beautiful seascape and finish with a photo out the window -- that's easy -- or you could veer off the road, pull the car over the shoulder, hit the brakes, step outside, take off your shoes and socks, step out into the sand, feel the sand under your feet, walk to the ocean, and hit the ocean up to your ankles.

You'll live a richer, more meaningful life this way, because you're breathing in that experience, and you'll leave your cell phone in the car.

thank you

(applause)

As a climate scientist, I hate the weather.

I've spent a lot of time in California, where the weather is nice all year round, so I think it would be nice to treat it as an option where you don't have to worry about the weather.

(Laughter) I don't want to experience clouds, much less study them.

But wherever I go, the clouds follow me.

Clouds are a nuisance in climate science

How the clouds will react as the Earth warms is an uncharted area, but perhaps that uncharted territory holds hope.

Maybe yes, maybe clouds will help slow the warming process and buy us time to react, which would be great for us at this point in time.

If clouds can protect the earth, I don't mind a little more cloudy days.

what is absolutely certain

Carbon dioxide is a greenhouse gas, and it's being emitted in large amounts, and it's causing the planet to warm.

indisputable

Even so, I go to work every day to do research.

And that's because there's actually a lot we don't know about climate change.

One thing in particular that is still unanswered is the origin of this question.

We know it's going to be hot, but we don't yet know exactly how hot it will be.

This is a question that should be easy to answer if someone could provide me with a time machine.

But let's be honest, even if I had a time machine, I wouldn't want to be at this point in history.

So if you want to see the future, you have to rely on the output of computer simulations, like this climate model.

In my field of research, a lot of very "nice" people I meet on the Internet all insist that the climate model is completely wrong.

What I want to say is, "You're kidding!

Are you serious? I get paid to find fault with climate models."

We don't expect perfection in our models

I want you to help me instead.

Think about it: a computer simulation that can recreate all of reality.

It's not a climate model, it's the world of The Matrix.

Models can't predict like a crystal ball

It's just a research tool, and we often learn from model errors.

For example, some climate models can pretty much capture the actual warming that's happened so far.

But if we fast-forward to the end of this century, assuming a scenario of continuation of social activity as we know it, some climate models no longer fit.

Of course, everything points to warming, but this is a basic physics problem.

But some models predict catastrophe -- five times the current level of warming.

Other models, on the other hand, just make more sober predictions.

So why is it that all climate models don't agree on the point of warming?

A big reason for that is that there is no consensus on how clouds will affect the future.

That's because computers, like me, find clouds to be a nuisance.

The reason computers don't like clouds is that clouds can be very big and very small at the same time.

Clouds are formed when tiny water droplets or ice crystals clump together around tiny particles.

On the other hand, it's also large enough to cover two-thirds of the Earth's surface.

To build an accurate model of a cloud, we need to know the motion of every water droplet and dust particle in the entire atmosphere, and no computer is powerful enough to do that.

So instead, you're forced to make a compromise. You can zoom in and be more precise with the details, but you have no idea what's going to happen in the world as a whole, or you can sacrifice the substance of the details to understand the bigger picture.

There's no one right answer, no one perfect way, so different climate models focus on different things.

It's really unfortunate that computers have trouble analyzing clouds, because clouds play an important role in regulating the Earth's temperature.

When all the clouds are gone, we're bound to experience a definite climate change.

Do you think the earth would be hotter or colder without clouds?

Both phenomena appear

To be honest, I'm not very good at identifying clouds.

i like cloudless

I do know that clouds come in many different shapes and sizes.

Thick low clouds like this are effective at blocking the sun and ruining your barbecue, and delicate high clouds like this cirrus let most of the sunlight through.

All sunny days are the same, but cloudy days are different

And this diversity complicates the effects of clouds on the planet.

So in order to understand the effect that clouds have on the planet, taking a selfie can help.

It's always been a great idea to be able to observe the Earth from space, but we still can't see everything.

because the clouds obscure the view

that's what clouds do

These thick low clouds are excellent at shading the sun.

Reflects about 20% of all the light that comes from the sun

A lot of solar energy is wasted

Low clouds act as strong shades, cooling the Earth.

But that's not the only role of clouds.

The earth maintains a temperature, and like all objects that maintain a certain temperature, it radiates heat.

It radiates heat energy out into space, and this phenomenon can be seen in infrared observations.

Clouds still block the view

Because high clouds are in the coldest layers of the atmosphere.

So very little heat radiates out into space from these clouds.

At the same time, it also blocks the heat coming from the earth.

High clouds are preventing the Earth from cooling naturally.

that creates a strong greenhouse effect

So clouds have two very different effects on the climate system.

Low clouds act as sunshades, keeping the planet cool, and high clouds create the greenhouse effect, warming the planet.

Because the sunshade effect is slightly stronger

If tomorrow all the clouds are gone, just in case - I'm not advocating that, the earth will be warmer.

Of course not all the clouds are gone.

But climate change is a matter of change

So the question is, how will global warming change clouds?

Remember, clouds play an important role in regulating the Earth's temperature, warming and cooling the planet at the same time.

Even small changes in cloud cover can have serious consequences.

So we can also ask: How do clouds contribute to global warming?

There may be a silver lining in that answer.

If global warming triggers changes in clouds that reduce the greenhouse effect or increase shading, they may become more cooling.

It's going to have the opposite effect of warming, and that's what climate models that predict modest warming do.

But climate models struggle with cloud problems and uncertainties in the direction of change.

Clouds have the potential to help fight global warming, but on the other hand

can make the situation worse

We know that climate change is happening because it's visible: we're seeing rising temperatures, melting ice caps, changing rainfall patterns.

You might think that clouds change too.

But here's the bad thing: clouds are hard to see.

And when I say that, I see people from the Pacific Northwest saying, "Well, we're used to clouds and we'll tell you."

(Laughter) To all of you, we also looked up and saw.

(Laughter) But in cloud science research, we need to look at all the clouds, all over the world, for very long periods of time.

That's the hard part of this research.

So there is nothing better than a satellite for observing clouds.

(Laughter) Luckily, satellite observations of clouds have been done, and records date back to the 1980s, when I was born.

But these satellites were developed for meteorology, not for climate observation.

Not suitable for long-term observation

So we need climate science to gather information about long-term trends.

Multiple satellites have different observation angles, different orbits, and different on-board camera equipment, so the observation data has to be spliced ​​together.

As a result, there are still gaps in our knowledge.

But even these "cloudy conditions" can give us clues for future predictions.

When I looked at the observations, there was one thing that caught my eye: the clouds are moving.

As the temperature of the earth rises, the high clouds rise.

We're going to the highest, coldest part of the upper atmosphere, and what we're saying is that even though the Earth is warming up, the high clouds aren't warming up.

keep roughly the same temperature

It doesn't mean more heat is emitted into space.

On the other hand, clouds will trap more heat from a warming planet.

This phenomenon enhances the greenhouse effect

High clouds are exacerbating the warming.

Clouds move in different dimensions

The atmospheric circulation, the large-scale movement of air and moisture in the atmosphere, is changing here, and the clouds are changing with it.

On a larger scale, clouds seem to be heading from the tropics to the poles.

It warms up with age, the opposite direction of your grandparents.

This is the problem, because if you want to block the sun's rays, you're better off in the tropics, where the sun is shining brighter, than in high latitudes.

If this continues, it will exacerbate global warming.

What we haven't discovered in years of pursuit is a sign that the opposite is happening.

Observational evidence has not proven that clouds significantly slow down warming.

It seems that the earth cannot cool itself down by its own power.

still uncertain

The future is still uncertain

And yet we send our children into the unknown of no return.

I hope they're ready to face that situation, and that requires keeping Earth-observing satellites in orbit, hiring diverse, smart, talented people who aren't afraid of clouds, and advancing climate models.

Uncertainty is not ignorance

We don't know everything, but that doesn't mean we know nothing. We know the effects of carbon dioxide.

My career started in astrophysics, so you can trust me when I say this is the best place in the universe.

Other planets may have liquid water

the earth has whiskey

(Laughter) (Applause) We're lucky here on Earth, but that doesn't mean we can rest on our laurels.

I don't think clouds will save the earth

it's probably on our shoulders

thank you

(applause)

I never thought superheroes would become such a big part of my life.

When I was a kid, I saw them and thought they were completely different from me.

They were muscular, they were cool like models, and they had incredible supernatural powers.

Then what about me?

It's kind of like this, just shorter and curly, but I've never felt strong in myself.

I felt like I was just a nervous, low-energy ball, and superheroes, like school bullies, weren't accepted.

So I kept my distance

I mean, who would want to be a superhero, when the only Puerto Rican women from the Bronx are around?

(Laughter) My aunts were police and paramedics. My grannies were seamstresses and street jewelry sellers.

For me, superheroes were the people around the table.

I don't know how many of you have spent time with Puerto Rican women, but we are also the best storytellers in the world.

I used to listen to the voices of the women in my family at my grandma's dinner table and listen to their raw and poignant stories about their lives in the Bronx.

I strongly longed to be like that myself

But I wasn't as strong as they were.

So I mostly just listened, and I was totally immersed in it.

It's funny, it's silly, it's kind, it's my favorite subject matter, and that's why I wrote a young adult novel called Juliet Takes a Breath, which explores sexuality, family and identity, about a chubby queer Puerto Rican girl from the Bronx.

"Juliet" won, and Marvel Comics approached me to write a stand-alone series about Marvel's first Latino lesbian superhero, America Chavez.

Yay!

(Cheers) (Laughter) Yes attention

Created by Casey and Dragotta for the Marvel miniseries Vengeance, America Chavez has been the heroine of the Marvel Universe for more than seven years.

She's a tough Latino, strong enough to punch open a door to another dimension.

(laughs) I understand.

(Laughter) We were all very excited to finally have a story written by a queer Latino who shared her identity.

"I understand, too", right?

Also, I saw in America Chavez a Latino girl surviving a harsh reality.

Because her mother risked her life to save the universe when she was little, and since then she's lived alone.

No wonder she got tough

The common point of being in a situation where you have to be tough has caught on.

Like I said, I grew up in the Bronx. The Bronx is a tough city. It's tough enough to ignore the monuments on the sidewalks and shy away from police towers on the way to board the train.

When something really bad happens Everyone's like, "Hey, don't stop, keep going."

"Don't cry, don't lose to that"

Neither my mother nor my aunts nor my grandmothers have ever seen them rest or take care of themselves.

their sensitivity? that kind of thing only at home

So the first thing I wanted to give America Chavez was sensitivity. It's actually something I wanted to give to my aunts and grandmothers.

For example, it's okay to just sit in silence, or you can go on a journey just to find yourself.If the pain is eating you up and you're feeling like you're falling apart, you need someone to help you, and that's okay.

Empathy and healing didn't come to me out of the blue.

I had to quit my job for that What do you mean?

I gave her a superhero vacation (Laughter).

(Laughter) (Applause) Where else can she feel safe and respected and free? It's a college dedicated to the first Puerto Rican woman appointed to the U.S. Supreme Court.

The first class she took was "Intergalactic Revolutionaries and You," and America was so excited. She's ready to show her strength.

It limited her powers, changed her place, changed her world upside down, because that's what college is all about. (Laughter) Especially when she's lonely.

But I didn't want America to be alone for a long time, so while doing her schoolwork, a mistake happened and she was sent to the X-Men universe.

(Laughter) When I was in college, the Reverend Kelly Brown Douglas was my mentor, and I knew that America Chavez needed someone like that.

Who better to lead America Chavez than Storm? The first black female superhero and one of the strongest in the X-Men, right?

Who else but her?

(Laughter) Storm teaches America how to control her emotions inside the dimensional door. When America quiets her mind, the dimensional door opens, and in that silence she can listen to anything and everyone.

Until then, no one had suggested silence and meditation to her as a way to get stronger.

At first she refused, but with Storm's encouragement she persuaded America to bring silence to the world around her and embrace her vulnerability.

I mean, she and Storm even hug.

I know

My tutors loved me so much that they encouraged me to explore myself and my ancestry, and at 19 I had no idea what that meant.

I didn't study Puerto Rican history in college.

I learned the history of Puerto Ricans on my grandma's lap. She pulled out an old album and told me, one by one, who was in America and who was still on the island.

So it was inevitable that I would bring Grandma to America Chavez. You can't just be any Grandma. She's a big, strong, dependable Grandma.

America sees Planet Fuertna, the planet Grandma was born in. America learns that the planet was invaded and Grandma and her mother escaped.

I also saw their joy when their new home welcomed them warmly and protected them well.

She learned that with great grief comes much more healing, which is right next to the tremendous strength of her family.

You can find that anywhere, right? I sent her little words of love, for her and for all the queer kids of color who are trying to be great people.

Like when you lose yourself, you dig deep into your ancestors because you see a part of yourself in them.

And it reminds me that sensitivity is not about running away, hiding, keeping your mouth shut, or standing still.

It is also something that encourages us to fulfill our responsibilities.

Like when America went back to World War II and confronted Hitler and knocked him out completely

(Laughter) I don't think you need America Chavez to beat the Nazis in 2018, just like Captain America did in 1941.

(Laughter) (Applause) (Laughter) Even the right thing to do is enough to wear her down a little bit. So I gave her a best friend.

(Laughter) When the unscrupulous corporation Midas took over the University of Sotomayor and nearly killed America by threatening to close the dimensional door.

her ancestors reached out

Because I knew she needed healing.

That burst of care and healing gave her the power to overthrow Midas and regain herself.

The conventional wisdom that you have to do something by yourself or that you have to be tough

it doesn't help us

America Chavez is a superhero, but he still needed everyone's help to figure him out.

And what she needs is kindness, kindness grounded in empathy and dedicated to justice and freedom.

Because where sensitivity and fragility become strength, where we transcend our usual limits and become greater, more dignified, greater selves.

thank you

(applause)

Exactly one year ago, for the third time in my life, I ceased to exist.

I had a little surgery and my brain was completely anesthetized.

I remember feeling disconnected and falling apart and feeling cold.

Then I came back. I was dazed and confused, but I was there.

When you wake up from a deep sleep, you may not know what time it is, or you may be afraid that you overslept, but there is always that basic sense of continuity between the past and the present that time has passed.

Waking up from anesthesia is a whole other thing.

It could have been 5 minutes, it could have been 5 hours, it could have been 5 years, it could have been 50 years.

i simply don't exist

I lost all consciousness

Anesthesia is modern magic.

It turns humans into objects, and then turns them back into humans, hopefully.

And there's something about this process that's still a big mystery in science and philosophy.

how consciousness arises

Within each individual's brain, there are billions of neurons, each of which is a tiny biological machine, working together to create conscious experiences.

It's not just a conscious experience, it's your conscious experience in the here and now.

how this happens

It's very important to answer this question, because our consciousness is all there is.

Without consciousness, the world doesn't exist, you don't exist, nothing exists.

When you're in pain, you're conscious of it, whether it's mental illness or pain.

And if we can experience joy and pain, what about other animals?

Are animals conscious?

Do you have a sense of yourself

And if computers get faster and smarter, maybe in the not too distant future my iPhone will have a sense of its own existence.

In fact, I think the chances of AI being conscious are low.

Because my research shows that consciousness has more to do with the nature of living, breathing organisms than with pure intelligence.

Consciousness and intelligence are two different things

You don't need to be wise to suffer, but you do need to be alive.

What I'm going to tell you is that the conscious experience of the world around you and of yourself in it is, in a sense, a controlled hallucination that occurs only in the presence of a living body, through a living body, and because of a living body.

Now, you may have heard that we don't really know how the brain and the body generate consciousness.

Some even say it's beyond science.

But the reality is that in the last 25 years there has been an explosion of scientific research in this area.

If you come to my lab at the University of Sussex, you'll see scientists from all walks of life, and sometimes even philosophers.

What we're trying to understand is how consciousness arises and what happens when it doesn't work.

The method is very simple

To think about consciousness, you have to think the same way you think about living things.

It used to be thought that the nature of being alive could not be explained by physics and chemistry, that life must be more than just a mechanism.

But now it's not considered

Biologists worked to explain the peculiarities of living systems in terms of physics and chemistry, such as metabolism, reproduction, homeostasis, and so on. The basic riddles of what life is have disappeared along with it, and no more magical answers like "the force of life" or "the leap of life" have been proposed.

As with life, so with consciousness.

Once we start trying to explain the nature of consciousness in terms of what's going on inside our brains and bodies, the seemingly unsolvable mystery of what consciousness is will disappear.

At least in blueprints

let's get started

what is the nature of consciousness

What does the science of consciousness have to explain?

Today I want to think about consciousness in two ways.

There is an experience of the world around us, a panoramic, 3-D, fully immersive mental movie filled with lights, sounds, smells, and a multitude of sensations.

and there is a conscious self

The unique experience of being yourself

That's the main character in this mental movie, and that's probably the aspect of consciousness that we all cling to the most.

Let's start by thinking about the experience of the world around us and the important idea of ​​the brain as a predictive engine.

Put yourself in your brain and imagine

Trapped in a hard skull, trying to understand what's going on in the outside world.

There is no light inside the skull, there is no sound.

We're forced to rely on the only electrical impulses available, which are only indirectly related to whatever is happening in the world.

So the "perception" of knowing what's out there must be a process of informed speculation, where the brain combines these sensory signals with prior expectations and beliefs about what the world is like to form the best guess as to what caused the signal.

The brain doesn't hear sounds or see lights.

What we perceive is our best guess about what is happening in the world.

Let me give you some examples of what we've talked about so far.

You may be familiar with this optical illusion, but I want you to think about it in a new direction.

If you look at the two plots A and B, you should see very different shades of gray.

But it's actually the same density.

can show it

In the second version of the painting, the gray bars connect the two plots, and they look completely identical.

The shade of gray is exactly the same.

If you still don't believe it, try shifting the bars and stacking them on the parcels.

It's just one solid gray blob, no difference at all.

This is not a trick or anything

It's the same shade of gray, but when you remove the bar, it looks different again.

What's happening is that the brain is using prior expectations, which are deeply embedded in the circuitry of the visual cortex, and say, "The surface of an object appears darker when it's shadowed." That's why B appears brighter than it actually is.

Here's another example that shows how quickly the brain can use new predictions to alter the conscious experience.

listen to this

(distorted voice) Sounds kind of weird, doesn't it?

Let's listen again to see if we can understand anything

(distorted voice) It's really weird, isn't it?

now listen to this

（音声） I think Brexit is a really terrible idea.

(Brexit is such a terrible idea) (Laughter) I really do.

I heard what you were saying

Now listen to the first audio again. Play the same.

(distorted voice) I think Brexit is a really terrible idea.

one more time

(distorted voice) So what's going on here?

What's remarkable is that the sensory information reaching the brain hasn't changed at all.

The only thing that's changed here is your brain's best guess as to what's causing the sensory information.

That inference changes what you consciously listen to.

This gives us a slightly different perspective on the brain's basis for perception.

Perception relies not only on signals coming into the brain from the outside world, but it also relies, if not less, on perceptual predictions in the opposite direction.

We don't just passively perceive the world, we actively create it.

The world we experience comes not only from the outside, but it is created, if not less, from the inside.

Let me give you another example, this example of perception as a process of active construction.

Here, we combined immersive virtual reality and image processing to simulate the effects of overly strong perceptual predictions on experience.

The world is transformed in this panorama, in this case the campus of the University of Sussex, turned into a psychedelic playground.

We processed the material using an algorithm based on Google's Deep Dream to simulate the effects of overly strong perceptual predictions.

This time I made the dog visible

this would look very strange

In this way, when the perceptual anticipation is too strong, it looks like the hallucinations reported by people under the influence of drugs, and it might even resemble a psychotic state.

Let's think about this for a second

If hallucinations are a kind of out-of-control perception, then perception in the here and now is also a kind of hallucination, except that this one is in control and the brain's predictions follow sensory information from the outside.

In reality, we're all hallucinating all the time, even here now.

When we all agree about hallucinations, we call it "reality."

(Laughter) The next thing I'm going to tell you is that your experience of your self, your unique experience of being yourself, is also a controlled hallucination generated by your brain.

it seems like a really weird idea

Even if the illusion deceives the eyes, the sense of "I am" must be deceived.

For most of us, the experience of being a human being is so familiar, cohesive, and continuous that it's hard to take it for granted.

But it shouldn't be taken for granted

In fact, there are many facets to the experience of being yourself.

I have a body and I have the experience that the body is me

I have the experience of perceiving the world

There's the experience of trying to do something, of being the cause of what's happening in the world.

It's a rich combination of memories and relationships, partly because it's the experience of being a human being with continuity through time.

As many experiments have shown, and as psychiatrists and neuroscientists know all too well, these different experiences of being yourself can be disruptive.

So the basic background experience of being who we are as a unity is a fairly fragile construct by the brain.

It's an experience that, like anything else, needs an explanation.

Let's go back to our physical selves

How does the brain generate the experience that the body is you or that you have a body?

Exactly the same principle applies

Your brain makes its best guess as to what's part of your body and what's not.

Neuroscience has great experiments to illustrate this.

Unlike most neuroscience experiments, you can do this at home.

All I need is this rubber hand

(Laughter) And two paintbrushes.

In this "rubber hand illusion," the real hand is hidden from view and a fake rubber hand is placed in front of the participant.

And the person is staring at the fake hand while the real and fake hands are stroked with a paintbrush at the same time.

And most people, after a while, have a very strange feeling, they start to feel that the fake hand is part of their body.

So if you see a hand-like object roughly where your hand should be being stroked, and it matches the sensation of being stroked, that's enough evidence for your brain to make its best guess, such as that the fake hand is part of your body.

(Suddenly, a fake hand is impaled — Laughter.) There's all sorts of clever measurements.

We could measure the skin conduction response or the startle response, but you don't have to.

The young man in the blue shirt clearly felt the fake hand as if it were his own.

So even the experience of what your body is is a kind of best guess, a kind of controlled hallucination by the brain.

there is one more

We don't just experience our bodies as objects in the outside world; our experience of the body also comes from within.

We all experience this sense of being that body from within.

And the sensory signals coming from inside the body tell the brain continuously what the internal organs are doing, how the heart is beating, what the blood pressure is, and many other things.

This kind of perception is called "interoception," and it's often overlooked.

It's very important, because it's the perception and regulation of the internal state of the body that keeps us alive.

This is another version of the "rubber hand illusion"

it's in our lab

Here, participants see a virtual reality version of their own hand that turns red when it's in or out of sync with the heartbeat.

When it turns red in sync with your heartbeat, you feel more like you are part of your body.

So the experience of having a body is deeply rooted in the perception of the body from within.

There is one final thing I would like to draw your attention to: the experience of the body, which comes from within, is very different from the experience of the world around us.

When I look around me, the world seems to be filled with objects: tables, chairs, rubber hands, you guys, and even my body is in the world.

The experience of the body from within is quite different.

I don't really perceive things like, "Here's my kidneys," or "Here's my liver." And the spleen...

I don't know where

I do not perceive my interior as an object

I'm not even aware of it unless there is a problem.

i think this is important

Our perception of the internal state of the body isn't about knowing where things are, it's about controlling and regulating: keeping physiological variables within a narrow viable range.

We perceive objects as sources of sensations when our brains use predictions to try to understand what's out there.

When the brain uses anticipation to control and regulate, we experience control over and under control.

So our most basic experience of being ourselves, of being a physical organism, is deeply rooted in the biological machinery that keeps us alive.

And if we follow this line of thought so thoroughly, we can see what our whole conscious experience looks like, because it all depends on the same mechanism of predictive perception that stems from the basic urge to live.

Our world and our experiences arise only through, through and because of our living bodies.

Let's summarize little by little

What we consciously see depends on our brain's best guess as to what's there.

The world we experience is not only created from the outside, but also from the inside.

The "rubber hand illusion" shows us that it applies to our experience of what is and isn't our body.

These self-related predictions are highly dependent on sensory signals that come from deep within the body.

And finally, the experience of having a body is less about where things are and more about control and regulation.

So our experience of the world around us and of ourselves within it is like a controlled hallucination, shaped by millions of years of evolution to survive in a world of danger and opportunity.

We are kept alive by predictions.

And finally, I would like to suggest three things.

Number one, just as we can misperceive the world, we can also misperceive ourselves when our predictive mechanisms fail.

Understanding this opens up a lot of new possibilities in psychiatry and neuroscience, such as depression, schizophrenia, and the like, which may not only address the symptoms, but also the mechanisms underlying them.

Number two, "I am" cannot be translated into a program inside a robot, nor can it be uploaded, even to the smartest and most sophisticated robots.

We are living creatures, we have flesh and blood, and our conscious experiences are shaped at every level by the biological mechanisms that keep us alive.

Just making a computer smarter doesn't make it sentient.

Third, our very own personal inner universe, consciousness, is only one form.

And what humans are conscious of is only a tiny fraction of the realm of what we can think of as consciousness.

Each person's self and world are unique to him or her, but everyone is grounded in biological mechanisms that are common to many other organisms.

Now, these are things that fundamentally change how we understand ourselves, and I think that's something to celebrate because, as science often does, we're not at the center of the universe. Copernicus, who said we're related to all living things, Darwin, and it continues to this day.

The stronger our sense of understanding, the stronger our sense of wonder, and the stronger our awareness that we are components of nature, not separate entities.

and···

Even if the end of consciousness comes, there's nothing to be afraid of-

there is nothing

thank you

(applause)

About every hundred years, somewhere in our galaxy, a massive star runs out of fuel.

This happens when, after millions of years of high temperature and pressure, the star's hydrogen undergoes nuclear fusion, transforming into heavier elements like helium, carbon, nitrogen, and then into iron.

Because it can't produce enough energy to support its structure, gravitational collapse causes a supernova explosion.

What was inside that star flew into space, seeding the galaxy with heavy elements.

But the legacy of this massive explosion is even more amazing: spheres of matter are so dense that the electrons that make up atoms collapse from their quantum orbits into the depths of the nucleus.

That stellar demise is the birth of a neutron star, one of the densest known objects in the universe, a laboratory of unknown physics made of extremely densely packed matter.

But what is a neutron star?

Think of a compact sphere where protons and electrons fuse inside to form neutrons, forming a frictionless liquid called a superfluid, surrounded by a shell.

It's super dense, equivalent to the mass of a fully loaded container ship compressed into the size of a hair, or the mass of Mount Everest compressed into a sugar cube.

Deep in that electron shell, a superfluid of neutrons forms a different phase, which physicists call "nuclear pasta," like lasagna turned into spaghetti.

A big precursor to becoming a neutron star is that it often spins.

When stars collapse, stars that are typically millions of kilometers in size are compressed into neutron stars that are only about 25 kilometers in size.

The angular momentum that the star originally had is preserved.

A neutron star spins much faster than its original star for the same reason a figure skater puts his hands inwards and spins faster.

The fastest neutron rotation record is 700 revolutions per second, which means that a point on the surface is spinning in space at more than one-fifth the speed of light.

Neutron stars also have the strongest magnetic fields of any known celestial body.

This concentrated magnetic force forms vortices that radiate electromagnetic waves from the magnetic poles.

The line connecting the magnetic poles doesn't always line up with the axis of rotation of the neutron star, and the electromagnetic waves spin like the light of a lighthouse and appear to blink when viewed from Earth.

This is called a pulsar

In 1967, astrophysicist Jocelyn Bell discovered this intriguing blinking signal, effectively making it the first indirect discovery of a neutron star.

A neutron star that spins furiously slows down over billions of years in its later life, as it radiates energy in the form of electromagnetic waves and gravitational waves.

But not all neutron stars die quietly.

For example, a neutron star co-orbiting another star -- binary star systems have been observed.

A neutron star feeds on its lighter companion star, gorging itself on its weakly bound atmosphere, and eventually undergoes a catastrophic collapse into a black hole.

Many stars are in binary star systems, but only a few of them are binary systems of two neutron stars that waltz around each other and eventually merge.

When they finally collide, they send out gravitational waves into space-time, like throwing a stone into a still lake and ripples spreading across the water.

Einstein's general theory of relativity predicted this phenomenon more than 100 years ago, but it was only directly demonstrated in 2017 when the gravitational-wave observatories LIGO and VIRGO observed a neutron star collision.

Other telescopes have detected gamma rays, flashes, later X-rays and radio signals emitted from the same impact.

It became the most studied event in astronomical history.

It yielded valuable data that helped determine the speed of gravitational waves, support important theories in astronomy, and provide evidence for the origin of heavy elements such as gold and platinum.

Neutron stars still hold secrets

LIGO and VIRGO are being improved to detect more collisions.

It will help us learn more about what the catastrophic demise of such a dense, pulsating object with a magnetic field tells us about the universe.

In ancient Greece, slaves, soldiers, poets, politicians, when they had to make big decisions about the most important questions in their lives, like, "Should I get married?"

Or "Should I start this voyage?"

Or, "Should my army advance into this area?"

I asked the "Miko (Oracle)"

Here's how it works: ask a shrine maiden a question and kneel, and she will go into a trance.

After a few days, the priestess finally came to her senses and answered the prophecy.

From ancient Chinese oracle bones to ancient Greek and Mayan calendars, people have longed for prophecies, to know what would happen next.

because we all want to make the right decisions

I don't want to miss

The future is scary, so it's great to know that you can make decisions with some sort of assurance of the outcome.

Now we have a new Oracle, which we call big data, Watson, deep learning, neural nets.

The question we ask Oracle is, for example, "What is the most efficient way to ship a smartphone from China to Sweden?"

Or, "What are the odds of my child being born with a genetic disorder?"

Or, "What are the sales forecasts for this product?"

My dog's name is Elle and she hates the rain.

I did everything to get rid of my hatred of rain

But it didn't work out, so I have to rely on the "oracle" in an app called "Dark Sky." Before I walk, I always look up the exact weather forecast for the next 10 minutes.

very cute dog

Because of this use, our projection is a $122 billion industry.

Despite being a huge industry, profits are surprisingly low.

Big data is easy to invest in, but hard to capitalize on

Over 73% of projects with big data are in the red, and executives come to me and say, "We're going through the same thing.

We invested in big data systems, but our employees can't make good decisions

Furthermore, there are no ideas that will lead to breakthroughs.”

All of this is really interesting to me, because I'm a technology ethnographer.

I study patterns in how people use technology and advise companies, and one of my areas of interest is data.

Why doesn't having more data help us make better decisions? Especially for companies that have all the resources to invest in these big data systems.

Why can't it be easier for them?

Now, I've seen this kind of conflict firsthand.

In 2009, I started working in research at Nokia.

And at the time, Nokia was the world's largest mobile phone company, and it dominated emerging markets like China, Mexico, India -- all of which were doing research on how low-income people used technology.

I also spent a lot of time, especially in China, getting to know the informal economy.

So I worked as a street vendor selling dim sum to construction workers.

I also did fieldwork, spending days and nights in Internet cafes, hanging out with young Chinese people, understanding how young people use games and cell phones, and how they use their phones when they move from the countryside to the city.

Through all of this qualitative evidence that I've gathered, it's starting to become very clear to me that China's low-income population is about to undergo a very big change.

They were surrounded by advertisements for all kinds of luxuries, like high-performance toilets, which we all want, right? And I've also noticed in conversations with them in apartments, cars, and so on, that the ads they were most drawn to were the ones for the iPhone that promised their debut into the high-tech life.

And even when I was living in an urban slum like this, I saw people spending more than half of their monthly income on a phone, and what increased was a cheap copycat of the iPhone called "Shanzai" and other brands.

It will be quite useful

works well

After a few years of living and working with migrant workers, doing pretty much everything that migrant workers do, I started to piece together all the data points -- from the seemingly disparate things like dim sum sales to the more obvious things like the evolution of cell phone bill payments.

And I was able to create a big picture of what was going to happen.

And that's when I started to realize that in China, even the bottom-income people wanted smartphones, and they would do just about anything to get one.

Remember, in 2009, when the iPhone first came out, about eight years ago, we had an Android phone that looked like an iPhone.

Many smart, pragmatic people have said, "Smartphones are just a passing fad.

Who would want to carry something so heavy? Even the battery runs out quickly, and if you drop it once, it breaks down.”

But I was very confident in my predictions based on a lot of data, and I was excited to share those predictions with Nokia.

But Nokia was skeptical, because it wasn't big data.

"We have millions of data points, but we don't see any indicators of people wanting to buy a smartphone, and just 100 separate data points are too weak to be taken seriously."

I said, "You're right.

If you're doing research on the premise that people don't know what a smartphone is, of course you can't see it, so obviously in the next two years, you're not going to have data about people wanting to buy a smartphone.

Your research and methodologies are designed to optimize existing business models, but the human dynamics that I see are things that are emerging, things that haven't happened yet.

We look outside the market dynamics and try to stay ahead of them.”

And you know the end of Nokia.

Performance fell off a cliff

This is the price to pay for overlooking something important.

it was immeasurable

But Nokia wasn't alone

I've seen various organizations discard data all the time because it didn't come from a quantitative model or because there was no model to match.

But it's not because of big data

It's how we handle big data, it's our responsibility.

Successful examples of using big data are based on quantifying very limited environments, quantifying mostly closed systems like power grids, logistics systems, genetic codes.

But not all systems are properly closed.

When you're quantifying a more dynamic system, especially when humans are involved in the system, the influencing factors become complex and unpredictable, and there's no way to model them well.

Once you predict something about human behavior, new factors emerge because conditions are always changing.

so it's a never-ending cycle

When you think you understand something, the unknown comes into play.

So relying solely on big data increases the chances that we might miss something, but also creates the illusion that we know everything.

What makes this paradox so difficult to notice and understand is a condition I call quantification bias, which is the unconscious belief that the measurable outweighs the unmeasurable.

And this is a common experience in our work.

Maybe we work side by side like this, or maybe the whole company is like this, where people are so fixated on numbers that they can't see anything else when the evidence is presented in front of them.

Quantification is such a compelling message because there's nothing wrong with it, and it's actually very satisfying.

Even the simplest Excel spreadsheets make me feel very comfortable.

(Laughter) It's just like, "Yeah! The formula worked, so it's fine. Everything is fine."

But the problem is that quantification is dependent.

If you don't have something to forget about it and constantly remind yourself of it, it's easy to throw the data away because you can't quantify it.

It's very easy to fall into silver bullet thinking, as if there is an easy solution.

This is a dangerous moment for any organization, and often the future we have to predict is not the haystack itself, but the tornado itself outside the barn.

There is no greater risk than being unable to see the unknown.

can lead to wrong conclusions

It can result in big things being overlooked

But you don't have to go down this road

It turns out that an ancient Greek oracle holds the secret key to revealing our destiny.

Now, according to recent geological surveys, the Temple of Apollo, where the most famous priestess delivered the oracle, was built on two seismic faults.

And these faults were releasing crude oil vapors from beneath the crust, and Miko was literally sitting right on top of these faults, sucking in tons of ethylene gas that was released from the cracks.

(Laughter) It's true.

(Laughter) It's a true story, and that's why the shrine maiden went into a trance while yelling and hallucinating.

she soared like a kite

(Laughter) How could I -- how could I have gotten useful advice from her in this situation?

Look at the people who surround the shrine maiden

People are holding her up She's a little dizzy, right?

And you can see the man on the left, and he's holding an orange notebook, right?

They were attendants and worked in tandem with the shrine maiden.

When the questioner comes and kneels, it's time for the temple attendants to go to work. After they question the priestess, look at their emotional state and ask follow-up questions like, "Why do you want to know this prophecy? Who are you?

What are you going to do with this information? " etc

The attendants added this answer as additional ethnographic and qualitative information, interpreting the priestess's murmurings as an oracle.

The shrine maiden didn't give the oracle alone. So should our big data.

Now, to be clear, I'm not saying that big data systems are ethylene sickness.

quite the opposite

But what I'm saying is that just like an oracle-reciting priestess needs a temple attendant, big data needs an attendant.

We need people like folklorists and user researchers who can collect what I call "thick data".

It's a valuable, non-quantifiable piece of human-derived data, such as stories, emotions, and relationships.

It's the kind of data that I've collected for Nokia, and it's available in very small sample sizes, but it's incredibly meaningful.

It's the experience of understanding human narrative that creates rich and thought-provoking data.

And that's what helps us find the oversights in the current model.

Thick data bases business questions on human questions, which is why combining big data and thick data brings us closer to the right picture.

While big data can bring us insights at scale and make the most of machine intelligence, thick data can help us regain the lost context and make the most of human intelligence when we make big data usable.

And when you actually bring the two together, it gets really interesting because you can do more than just work with the data you collect.

It also allows us to work with uncollected data.

You start asking why this is happening.

Now, Netflix has done this and opened up a whole new avenue for business transformation.

Netflix is ​​known for its very good recommendation algorithm, and they've given out a million-dollar prize to anyone who improves their algorithm.

some won prizes

But Netflix has realized that all improvements are incremental.

To find out what's going on, Netflix hired folklorist Grant McCracken to put together some sick data insights.

What he found wasn't initially visible in the quantitative data.

He discovered that he liked to look in one go.

without actually feeling guilty

was having fun

(Laughter) Netflix was like, "Oh, this is new insight."

So we used our data science department to scale up this thick data insight and match it with quantitative data.

Once they tested it and saw it worked, Netflix made a very simple but impactful decision.

Stop suggesting one show from different genres, stop suggesting different shows watched by similar users, and instead just show more and more of the same show.

I said, let's make it easier to take a quick look.

further there

They went to great lengths to redesign the entire viewing experience, and strongly encouraged "blow-reading."

So when there was a missed stream like "Master of None," friends and people disappeared en masse for an entire weekend.

By combining big data and thick data, Netflix has not only improved its performance, but also transformed the way people consume media.

And now, Netflix's stock is expected to double in the next few years.

But it's not just about more video views and more smartphone sales.

Embedding data-rich insights into algorithms can be the difference between life and death for some people, especially those marginalized.

Across the country, police are using big data for predictive policing, setting bail amounts and punishment recommendations in ways that reinforce existing biases.

Learning Algorithms in NSA's Skynet Devices May Have Caused the Deaths of Thousands of Pakistani Citizens from Misreading Metadata on Mobile Devices

As our lives become more automated, from automobiles to health insurance to employment, we are all likely to be affected by quantification bias.

Now, the good news is that we've come a long way from inhaling ethylene gas to make predictions.

Tools just got better, use them better

Integrate big data with thick data

Let's bring in the chaperones to assist the Oracle. Whether it's a business, a nonprofit, a government, a software, it matters where this system operates.

This way we won't lose sight of what's important.

(applause)

If you've been thinking about American politics and trying to understand what's been going on lately, you've probably come to three conclusions: 1. Partisanship in the United States is at its worst. 2. The United States is geographically divided for the first time.

What I want to talk to you about today is that all of these ideas seem plausible at first glance, but they're not.

In fact, partisanship in the United States dates back to the early days of the republic.

There was the same eerie geographic dichotomy then and now, and this has been the case throughout American history.

Finally, and most importantly, we actually have a special mechanism that helps us manage partisan strife and partisanship.

That technology is the United States Constitution.

The ever-evolving constitution is cleverly designed to be flexible, and has the specific purpose of teaching how to manage partisan disagreements, where feasible, and gives us the skills to navigate through this disagreement, where feasible.

Now, for what I'm about to tell you, I'd like to start by going back to a key moment in American history, the very moment when factional disagreement and partisanship arose.

There has been a moment in American history when partisanship was born, indeed.

The star of this story is James Madison.

James Madison was on top when this started.

He himself was like Einstein in making not only the United States Constitution, but the idea of ​​constitutional law more global, and he knew the time was ripe.

In just three years, from 1785 to 1788, he conceived, theorized, designed, and ratified the Constitution of the United States.

Now, let me show you the true magnificence of this achievement. What Madison didn't know then, is that the same constitutional technology that he invented is still being used today, not only in the United States, but 230 years later, in Canada, India, South Africa, Brazil, and elsewhere.

In a wide range of contexts around the world, this technology is still the dominant and most effective technology for governance.

At the time, Madison believed that he had solved this problem, that the country would run smoothly, that he had developed technologies that minimized partisan interests, and that there would be no political parties.

In particular, he was against the existence of political parties and intended to design the constitution so that they would be unnecessary.

He received a great deal of help from Alexander Hamilton during the final phase of the constitutional program, the ratification push.

Hamilton was a stark contrast to Madison.

Contrary to Madison, who is reserved, Hamilton is passionate.

Madison, on the other hand, didn't speak to a woman until she was 42, and married her first partner, Dolly, and lived happily for the next 40 years.

(Laughter) And frankly, I would say that Hamilton would have been the subject of a hip-hop musical.

(Laughter) No, not for any kind of musical.

But surprisingly, these two men teamed up to write "The Federalist," a collection of essays that proved the legitimacy of the Constitution and, as I said earlier, worked very well as a plan for promoting its ratification.

When the new government came into being, Hamilton became Secretary of the Treasury, but he had a clear idea.

And it's about doing to financial institutions and infrastructure what Madison did with the Constitution.

This also became known to all of his contemporaries.

He told Madison, who probably didn't like the move, that Hamilton was the Newton of infrastructure.

the idea is really clear

Hamilton established the Bank of the United States in the United States, set up perpetual bonds, which he called "immortality," and established policies that favored trade and manufacturing over agriculture, which had been the nation's chief wealth for generations.

Madison was furious

Instead of making an important and decisive decision, and simply blaming his old friend Hamilton for wrongs or adopting the wrong policies, he argued that Hamilton's ideas were unconstitutional and violated the fundamental spirit of the constitution they had drafted.

Hamilton's reaction was exactly what you'd expect.

He declared Madison a "personal and political enemy."

Best friends, allies and partners, these two founding fathers began to become hostile.

We did this in a familiar way.

First they formed a political party

Madison originally formed the "Democratic-Republican" or "Republican Party" Hamilton formed the "Federal Party"

The positions adopted by these two parties were extreme and stressed.

To give you a simple example, Madison always believed that a country was made up of manufacturing, trade and agriculture, so he began attacking Hamilton as a pawn of the financial markets, which he wanted himself to be in charge of the country.

It was extreme, but Madison had come to believe it.

He also attacked city life, saying that both coasts were corrupt, and that what people needed was to look to the heart of the country, to the interior, and that farmers were the essence of Republican virtue.

Hamilton countered that Madison was naive and childish, and that his aim was to make the United States a primitive, despotic country, isolated and unworkable on a global scale.

(Laughter) Both sides are serious, and there's some truth to what they're saying, and that's because each side is exaggerating the other's point of view so much in order to gain an advantage in the fight.

They published a newspaper, and for the first time in American history, the news was being told to the public from either the Republican or Federalist perspective.

What were the results?

It turned out that the constitution worked.

But in an amazing way that Madison himself never thought of.

First, a series of elections were held

The first two times, the Federalists defeated the Republicans.

Madison was surprised

Of course, I complained about the reports.

(Laughter) Again, from a rather innovative perspective -- Madison can't be less innovative when he thinks about anything. He determined that the press is Federalist-friendly because all the newspaper advertisers are Federalists, because they're British-owned coastal traders and allies with the Federalists.

this was his original explanation

But once the Federalists passed a law about the administration that made it a crime to criticize the government -- which happened in the United States -- nevertheless, the Republicans began to fight back, emphasizing the freedom of speech that Madison built into the Bill of Rights, and began to organize the power of civil society.

Sure enough, all over the country, small local groups called "Democratic-Republican Associations" formed to fight against the one-party dictatorship of the Federalist Party.

Eventually, the Republicans managed to win the election in 1800.

Madison became secretary of state, his friend and mentor Jefferson became president, and he gradually succeeded in crippling the Federalist Party.

this was their purpose

Why is this happening?

That's because the constitution originally had some features dealing with partisanship.

what was it?

First, and most importantly, free speech.

It was a groundbreaking idea at the time

So even if you lose power, you can still criticize the government for being terrible.

The second is the organizing of civil society.

Organizations that have the power to bring about radical change, whether it's a civil society, an individual, or a political party.

Most important is the separation of powers, which is an important element of the constitution.

When it comes to separation of powers, not just then, but now as it is today, it leads to a middle path in governance.

Right or left, with help from the fringes, you can be president in the United States.

It turns out that unless you partner with the centrist, you can't govern.

As soon as the government takes office, there will be midterm elections.

These lead the president to the middle road

Because of the separation of powers structure, the president can't actually govern, he can only introduce legislation that requires the consent of other lawyers.

These principles still work perfectly today, as the newspapers reveal today.

No matter what president is elected, if he doesn't follow the constitution, he can't get anything done.

In addition, a president needs legislators who understand the need to win elections based on centrist voters, and policy-supporting staff to pass laws.

I can't do without it

The conclusion of this short talk on the history of partisanship is this: partisanship is real, it's profound, it's very powerful, and it can be very confusing.

But constitutional design is deeper than partisanship.

Enables the management of partisanship where feasible Overcomes partisan divisions and creates compromises only where feasible

This kind of technology worked well for our founding fathers, and it worked for their grandchildren. It didn't work during the Civil War, but when it started working again.

It will work in our grandparents' generation, in our parents' generation, and in our generation.

(Applause) It's really easy for us to do.

Only by standing up for what you believe in, supporting the organizations you stand for, speaking out on issues that matter to you, getting involved, making a difference, stating your point of view, doing it with respect, knowledge and confidence, and working together, will the Constitution work.

take a deep breath and stand up for your beliefs

then it should work

thank you

(applause)

I was caught in a fire nine days ago.

I have 175 movies in my home, my 16mm negatives, photos in my books, and even my father's books.

I kept everything I collected because I was a big collector.

lost it all

I just didn't know what to do with this situation in front of me.

'Cause these burnt things were my everything? I was perplexed

I always live in the moment and I love this moment

cherish the future

When I was a kid, I was taught a strange thing: "You have to turn bad things into good things."

"You have to create good things out of bad things"

This time it was terrible.

This was my first camera lens, and I used it 35 years ago to photograph Bob Dylan.

This "King, Murray" is my work, and it won a prize at the 1970 Cannes Film Festival.I don't have a copy.

this is the document

it was only 20 minutes

I suddenly had an epiphany

"You have to make good things out of bad things." I told my friends, neighbors, and my sister.

This is last year's Sputnik.

This negative was put in another place, so it was safe.

This is a remnant of the equipment used in the feature film "Sputnik," which will premiere in downtown New York City in two weeks.

I told my sister and neighbors, "Come and dig the burnt ruins."

I called this is my workshop

for 40 years

where I've been working

be a nurse in san francisco

My daughter Jane rushed to me

I said, "Dig it out."

I wanted it even if it was a piece

And that's when I came up with "a life in pieces," and that was my next project.

This is my sister. She collected the pictures.

This is a burnt photo, but somehow I feel like it's gotten better

I looked at the burnt photo and said, "Oh, you're better." This is about Jimmy Doolittle.

Proposal for a TV show, the only burnt-out copy

"Thoughts on Women"

"It's terrible! Normally, you'd cry."

I didn't cry

Instead, I said, "I wonder if I'll make something out of this, maybe next year..." I'm so happy to be here today to share this moment with the people who comforted me.

This is a picture of Arthur Leipzig that I loved

I also had a lot of records. Records didn't help. Film burned.

It was 16mm nonflammable film.

Negatives also burned out

This is a letter from my father, inviting me to marry for the first time when I was 20.

this is my daughter and me

My daughter is still attending. She came this morning as well.

this is my house

My family lives in a hotel in Scotts Valley for now.

This is my wife, Heidi, she was really disappointed.

This is my son Davey and Henry

Davey taken at the hotel two days ago

So what I wanted to say in these three minutes is thank you for letting me share this experience with you. I love TED, and I'll be back.

As expected, I was able to enjoy TED again today.

This is the view from my window in Bonnie Dorn, a suburb of Santa Cruz, about 50 kilometers from here.

Thank you everyone

(applause)

introduce my mother

(Laughter) I think it's unexpected for all of you, and it's unexpected for me as well.

Identifying people is not my forte, due to my innate, untreatable, uncorrectable visual impairment.

I mean, I'm certified blind, but I like the lighthearted way of saying "I can barely see."

(Laughter) I have a legal status called "disabled."

I hate when the word "disabled" is used to describe people.

It explodes the notion of less than or equal to, a language that emphasizes impairments and deficiencies without regard for possibility, ability, or potential.

Sometimes this view becomes obvious

What should I do that he can't do on his own?

She may need help in this job that no other employee needs.

Sometimes hidden prejudices are expressed in a very gentle way.

"Well, Susan, look at your career and what you've accomplished in life.

How could you do that when you're visually impaired? ”

(Laughter) I'm not just a "disabled" person.

(Laughter) So I would like people all over the world to take it for granted that it's all too much, and to put aside the so-called "non-disabled" perspective, so I'm going to show you five tips on how to avoid being "disabled."

Tip #1: Know Your Superpowers

The best teams I've led in my entire career are superpower-based teams that have given themselves pretentious titles, like "The Breadwinner of Artisan Insight."

"Biscuit Butter Master"

(laughs) "Voice of Reason"

We trusted our strengths — we used our best strengths to achieve great results.

Thanks to a quality that even my own mother couldn't discern, I'm more fluid than ever. I take in a tremendous amount of cues on the fly and process them with precision.

See what other people can't see

Some people call it a superpower, but my really amazing ability is smashing into glass walls (Laughter) and allowing my friends to walk around with kale leaves stuck to their teeth.

(Laughter) It's true. Don't eat lunch with me. Same for dinner.

Tip #2 Be highly skilled - Be highly skilled at making mistakes

Just as important as having confidence in your superpower is believing in your FUBAR.

It's a millennial buzzword, "totally screwed up."

(Laughter) For example,

If you accidentally walk into the men's restroom, don't say, "Don't worry, everything here is too small for me to see." (Laughter) Even in the biggest stadium in the world.

I have to say that

To tell you the truth, it's better to come out and make people think it's because you're drunk.

(Laughter) Tip number three: know that everyone has a disability in some way. For example, if you have a cold and you don't know what it smells like, the only time you notice that the milk in your coffee is spoiled is when you put it in your mouth.

Most recently, a woman walked up to me in a commotion.

They said they couldn't find the bakery they were looking for.

"There are no shops on this side of the street, so maybe we should cross over—" "Oh no," she interrupted.

"There was

I wish I had a second eye."

(Laughter) Looks like mine helped.

I was trying to say, if you think logically, if you pay attention, if you think calmly, you can do it. But who am I?

Tip #4 Point out other people's disabilities

Only use this tip with people you know well -- and it's very important, because strangers invariably don't understand when it's time to tell them.

A few years ago, my parents and I went to see "The Rockets," the line dance at Radio City.

i whispered to my father

"The kicks of the two dancers on the left are not straight."

"Nothing like that"

"that's right"

"How do you know?

I can't see it."

But I know what straight legs look like.

He took a snapshot during our exchange to prove I was right.

my father saw the picture

i whispered more

“So who are the disabled?”

Tip #5: Explore Bold Goals

Overturn expectations, push your limits off a cliff, and bury them.

Some linebackers in college football blitz, tackle and recover fumbles with one arm.

A teacher who has been successful in imparting wisdom and inspiration to many students has Down syndrome.

And as for me, on my wish list is to ride the backseat of a two-person bike from Kathmandu, Nepal to Darjeeling, India.

It's an exciting adventure of about 1,000 kilometers, and I'm sure the pictures I'll show you will be out of focus.

(Laughter) Finally, let me introduce you to my mother.

I have to introduce

This is my mother. This is how I see my mother.

Or is this person an Asian man?

thank you

(applause)

Cancer [WARNING: This talk contains disturbing visuals]

Many of you have lost family, friends and loved ones to this terrible disease [WARNING: THIS TALK CONTAINS SENSITIVE VIDEOS] [WARNING: THIS TALK CONTAINS SENSITIVE VIDEOS]

Some of you may have survived cancer, some of you are currently fighting cancer.

I'm thinking of you

Cancer is often associated with sadness, anger and fear, but there's good news from the front lines of cancer research.

There are signs of victory in the fight against cancer.

Today, three of the most exciting advances in cancer research are colliding.

The first is cancer genomics

A genome is the organization of all the genetic information of an organism, encoded by DNA.

A change called a "mutation" occurs in the DNA, resulting in an out-of-control cancer.

About ten years ago, as part of a research team at Johns Hopkins University, I was the first to map cancer mutations.

First, mapping colon cancer, breast cancer, pancreatic cancer, brain tumors.

Since then, more than 90 projects in 70 countries around the world are trying to understand the genetic basis of all types of cancer.

Today, tens of thousands of cancers have been identified and their molecular structures are being detailed.

The second revolution is "precision medicine," also known as "personalized medicine."

Instead of a general-purpose method that can treat any type of cancer, a number of completely new therapeutic drugs have emerged that target cancer based on the genetic information of each cancer.

Already today, there is a wide variety of personalized medicine treatments called "targeted therapies" that allow individualized treatment for each patient, and many more treatments are in development.

The third big revolutionary development is immunotherapy, which is really exciting.

Scientists have used the immune system to fight cancer.

For example, the method we developed to suppress cancer uses new drugs to activate the immune system to suppress cancer.

Another method is to harvest immune cells from the body, boost the immune system, proliferate, and then put them back into the body to fight cancer.

Sounds like a sci-fi story

While working at the National Cancer Institute, I had the privilege of working with pioneers in this field, and I witnessed their development first-hand.

I continue to be very surprised

More than 600 clinical trials are currently underway, recruiting patients to explore all aspects of immunotherapy.

These three major revolutionary developments are happening, but unfortunately they're only in the early stages, and there's still a lot of work to be done.

I'll illustrate it with the example of one patient.

This is a patient with skin cancer called melanoma.

To my horror, the cancer had spread everywhere.

But scientists have successfully mapped mutations in this cancer and have targeted treatments against one of the mutations.

The results were miraculous

It was as if the tumor had melted away.

Unfortunately this is not the end

Here's a picture taken a few months later

the cancer has recurred

I wonder why?

It's because of intratumor heterogeneity

I will explain

That's because even a small cancer, only one centimeter in diameter, contains more than 100 million different cells.

Although all cancer cells are genetically similar, they have small differences that make them likely to respond differently to drugs.

So even if you have a drug that works well, and it kills most of the cancer cells, there may still be a small population of cancer cells that are resistant to that drug.

This ultimately becomes a recurrent mass of cancer cells that spreads throughout the patient's body.

So what do we do with this information?

The key is to get those amazing, advanced cancer therapies that I mentioned earlier, as early as possible, before resistant cancer cells appear.

So the key to curing cancer is early detection.

Anyone can intuitively understand

Statistics show that early detection of cancer yields better outcomes.

For example, in ovarian cancer, if it's found at stage 4, the survival rate is only 17 percent.

92% of lives can be saved if detected as early as Stage 1.

But sadly, only 15% of ovarian cancers are detected at stage 1, while the majority of those detected, about 70%, are already stage 3 or 4.

So we desperately need better cancer detection mechanisms.

The best current cancer detection methods fall into three categories:

First, for cancer screening, for medical procedures like colonoscopy for colon cancer screening.

Second, protein biomarkers such as PSA, which are used to detect prostate cancer, etc.

Thirdly, there are diagnostic imaging technologies, one of which is mammography for breast cancer detection.

Endoscopy is basically a trusted standard, but it can be highly invasive and require extensive equipment and facilities.

For some populations, protein markers are effective, but in some situations they are not very specific, produce many false positives, and result in unnecessary work-ups and procedures.

Imaging techniques can be used for certain cancer cell populations, but they expose the patient to harmful radiation.

Moreover, it is not applicable to every patient.

Mammography, for example, doesn't help women with dense breasts.

So what's needed is a non-invasive method that doesn't require extensive equipment or facilities, is highly accurate, doesn't produce false-positive results, doesn't use radiation, and can be applied to anyone.

And more importantly, we need a way to detect cancer before it grows to 100 million cells.

Is there such technology?

let me talk about that

I'm happy to be here to talk to you about a technology we recently developed.

At the heart of this technology is a simple blood test.

The blood circulation system may seem like something we'd take for granted, but it's essential for survival, delivering oxygen and nutrients to cells throughout the body and removing waste products and carbon dioxide.

The key biological insight here is that cancer cells grow faster than normal cells, but they also die faster, releasing their own DNA into the bloodstream when they die.

Because we know the mutational signatures of cancer cells that are being analyzed by the Genome Sequencing Project, we can look for all those mutational signatures and detect cancer early.

Instead of waiting until the cancer is big enough to cause symptoms, or dense enough to appear on an image, or until it's clearly visible in a medical examination, it's possible to find the cancer when it's much smaller than that by detecting a tiny amount of tumor DNA in the blood.

let me tell you how

First, let's start with the simple blood test I mentioned earlier, no radiation, no complicated equipment, just a simple blood test.

A blood sample is sent to us and we extract the DNA.

Most of the cells in the human body are normal, so most of the DNA comes from healthy cells.

Less than 1% of the DNA comes from cancer cells.

The sample was then subjected to molecular biological techniques to amplify the DNA molecules of cancer-related genomic sites known from cancer genome project information.

We run this DNA through a DNA sequencer and digitize it into the letters A T C G to get this sequence.

Ultimately, billions of these four letters of information will come out of this process.

We can run some statistical computations on this and find a small signal that indicates a small amount of cancer DNA in the blood.

Can this actually be used in patients?

Because we can't really predict which people will get cancer, we look at a more optimal population of cancers in patients in remission, especially in patients with lung cancer in remission.

Unfortunately, even with the best drugs available, most lung cancers recur.

So what's important is to see if we can detect recurrences earlier than conventional tests, when the cancer has not yet advanced.

We just finished our first big clinical trial to look at this with Professor Charles Swanton at University College London.

I'll take the example of one patient and explain it.

The days start counting when this patient has surgery to remove the cancer, and then she has chemotherapy.

then go into remission

monitored by physical examination and imaging

About 450 days after surgery, unfortunately, the cancer recurs.

I wonder if we can detect the recurrence sooner.

All along, we've been taking blood samples, and we've been able to measure the amount of circulating tumor DNA (ctDNA) in the blood.

At the time of initial diagnosis, as expected, the concentration of tumor DNA in the blood is high.

Its levels gradually decrease as medical procedures are administered, eventually becoming imperceptibly small.

But about 340 days after surgery, the level of tumor DNA in the blood goes up, and finally, around 15 months later, it's much higher.

And here's the big part, I'll repeat it again: 340 days after surgery, we're detecting elevated levels of tumor DNA in the blood.

So our method detects cancer recurrence more than 100 days earlier than conventional detection methods.

This means that we can get treatment and intervention 100 days earlier, which means we can have tumor removal surgery 100 days earlier, which means we can take steps to prevent tumor growth and recurrence more than 100 days earlier.

For some patients, those 100 days are the difference between life and death.

We are really excited about the results of this study.

And for this challenge, we've done follow-up studies in other cancer types -- breast cancer, lung cancer, ovarian cancer -- and I'm curious to see how early we can detect these cancers.

My ultimate dream is two blood collection tubes, and in the future, two blood draws will be done as part of a standard medical check-up.

DNA from those two blood draws could be matched against all known cancer mutations to detect cancers months, even years earlier than current methods.

Combined with existing therapies, this technology could save millions of lives.

Add to that the recent advances in immunotherapy and targeted therapy, and we're on the verge of eradicating cancer.

So next time you hear the word "cancer," I want you to have hope.

almost

Cancer researchers around the world are working hard to beat cancer, and the field is making tremendous progress.

This is a sign that this fight is over

It's time to win the battle against cancer

And this is great news for me

thank you

(applause)

I have a question for you: how many odors can we smell -- how many do you think we can accurately identify?

100？

300？

1000？

One study estimates that we can smell one trillion different odors.

1 trillion

It's hard to imagine, our noses have molecular machines that can do that.

Olfactory receptors, tiny smell detectors, are crammed within the olfactory epithelium of the nose, and they wait patiently to be activated by receptor-binding substances called ligands, such as odorants.

Like all vertebrates, humans have many olfactory receptors.

In fact, DNA is used to encode more types of olfactory receptor genes than genes for any protein.

Why is that?

Do olfactory receptors do anything else besides smell?

In 1991, Linda Buck and Richard Axel were awarded the Nobel Prize for identifying an olfactory receptor molecule.

At the time, it was thought that only the nose had olfactory receptors.

About a year later, research was published showing that olfactory receptors are expressed in tissues other than the nose.

Since then, one after another, other similar results have been published.

Now we know that these receptors are all over the body, and they're found in muscles, kidneys, lungs, and blood vessels, some of which you might never have thought of.

But what are the olfactory receptors doing there?

Olfactory receptors are sensitive chemical sensors in our noses that are sensitive to chemicals and give us the sense of smell.

It turns out that those sensitive chemical sensors are everywhere in the human body.

I'm not saying that your liver picks up the smell of coffee coming from the kitchen in the morning.

After you've had your morning coffee, your liver may be using olfactory receptors to detect changes in the concentration of chemicals in your blood.

Many different cells and tissues in the body use chemosensors to monitor the levels of hormones, metabolites and other molecules. Olfactory receptors are one such chemosensor.

The pancreas and the kidney need chemical sensors that are specific to each organ, so they monitor specific molecules, but they use the olfactory receptors they already have, and they don't do it twice.

Let's start with an example of an olfactory receptor found outside the nose. Let's look at a human sperm cell that expresses an olfactory receptor. Sperm with olfactory receptors look for chemicals -- ligands -- that bind to their receptors.

So the sperm swims toward the ligand.

This suggests an interesting

Do sperm sniff out where the ligand concentration is highest to find the egg?

What I love about this example is that the primary function of olfactory receptors is that they are chemosensors, but they are used in different ways.

Olfactory receptors have been suggested to sense and respond to chemicals inhaled by the lungs, as well as play a role in muscle cell migration and wound healing.

Similarly, taste receptors once thought to be found only on the tongue are now known to be found in cells and tissues throughout the body.

Even more surprising, recent research has shown that photoreceptors play a role not only in the eye, but also in the blood vessels.

In my lab, we're trying to understand how olfactory and gustatory receptors work in the kidney.

The kidney is the central control center that controls homeostasis.

For us physiologists, it makes sense to have a chemical sensor in our homeostasis center.

Various olfactory and gustatory receptors have been confirmed in the kidney, and one of them, olfactory receptor 78, is known to be expressed in cells and tissues that are greatly involved in blood pressure control.

When this receptor in mice is removed, the mice have lower blood pressure.

Amazingly, it turns out that this receptor responds to a group of chemicals called short-chain fatty acids that are produced by the collection of bacteria in our gut, the gut microbiome.

Short-chain fatty acids produced by gut bacteria are absorbed, reach the bloodstream, and bind to receptors such as odorant receptor 78. Changes that occur in the metabolism of the gut microbiome may therefore affect blood pressure.

We've identified several olfactory and gustatory receptors in the kidney, and we're just beginning to figure out, bit by bit, how each receptor works, and what chemicals it responds to.

There are many other organs and tissues that have work to do as well, and only a handful of receptors have been studied yet.

this is exciting

We are revolutionizing our understanding of how one of our five senses, smell, affects the body.

And it could change our understanding of some areas of human physiology.

It's early days, but we seem to have smelled what we're after.

(laughs) Thank you.

(applause)

The first time I cried underwater was in 2008 on the island of Curacao, far south in the Caribbean.

it's a very beautiful place

I was doing my doctoral studies on corals, and I was able to dive for days on the same reef and learn to tell them apart.

I made friends with coral, and that was normal.

Then Hurricane Omar hit, destroying the coral and stripping it of its epidermis, leaving only a tiny amount of damaged tissue that would be difficult to grow back.

When I first saw this damage spread across the reef, I collapsed on the sand in my scuba gear and cried.

If corals die so easily, how can coral reefs survive?

Why am I making a career out of fighting for corals?

It wasn't until last year that I first heard about that sort of thing from another scientist.

"I cried with my mask on," wrote one Guam scientist when he saw the damaged reef.

As one Australian scientist said, "We cried after showing our students the coral findings."

It's fashionable to cry about coral

(Laughter) And that's because the reefs in the Pacific are losing coral faster than ever before.

Because of climate change, the water gets so hot for so long in the summer that the corals can't function properly.

They expel the surface-dwelling zooxanthellae, leaving behind a clear white tissue that usually starves to death and rots.

Then the skeleton grows overgrown with algae.

this is happening on a tremendous scale

Last year, two-thirds of the northern Great Barrier Reef's corals died out over hundreds of kilometers, and this year's bleaching has spread further south.

Coral reefs in the Pacific are declining rapidly right now, and no one knows how far they will go, but...

Except for the Caribbean, where I work, the Caribbean has already experienced a dramatic decline in coral reefs.

Caribbean coral reefs have suffered terrible human abuse for centuries.

I already know what's to come

Maybe we can predict what will happen next

let's see the graph

Since the invention of scuba, scientists have been monitoring the number of corals growing on the seafloor and their changes over time.

Under severe human pressure for centuries, coral reefs in the Caribbean have suffered one of three fates.

There were coral reefs where coral cover declined rapidly.

Coral cover declined more slowly, but some reefs eventually lost as much.

This is the case of not-so-good endings.

But some coral reefs in the Caribbean are the most conserved, a little farther from human hands, and managed to maintain.

I would like to challenge this

And very few coral reefs were wiped out.

The second time I cried underwater was on the north coast of Curacao in 2011.

It was the calmest day of the year, but I always do a little diving here.

My boyfriend and I swam against the waves

I was checking my compass to find my way home. My boyfriend was wary of sharks. It felt like an hour, but after 20 minutes of swimming, we finally reached the reef and I was so shocked and so happy I cried.

Rows of 1,000-year-old corals

It has survived both the European colonial days of the Caribbean and the centuries that preceded it.

If given a chance to grow, coral would have had such a big vitality.

The truth is, even if we lose a lot of coral, even if there's a massive coral die-off, there will still be some reefs that will survive.

Some corals struggle to survive, while others live beautifully.

Protecting our coasts, providing food and supporting tourism will generate billions of dollars in value each year.

The best time to save coral reefs was 50 years ago, and the next best time is now.

Even if bleaching occurs more frequently and in more places, some corals will recover.

In the Caribbean in 2010, a bleaching event took place, and large parts of the epidermis were lost, like the brain coral in this picture.

This coral has lost half of its epidermis

But years later, if you look at the side of this coral, it's actually regaining its health.

This is what a healthy coral looks like

They're replicating polyps, fighting back algae overgrowth, and reclaiming territory.

If a few polyps survive, the coral can grow again, just needing time, conservation and the right water temperature.

Some corals recover in 10 years, others take longer.

The more we remove local stresses, such as overfishing, sewage pollution, fertilizer pollution, dredging, coastal construction, etc., the more corals can persevere and recover faster as we stabilize the climate.

New corals will emerge as we navigate the long, difficult but necessary process of stabilizing the planet's climate.

this is what i'm researching

We will study how corals produce babies, how they find their way to reefs, and develop methods to help them survive early, high-mortality life stages.

My all-time favorite baby coral showed up shortly after Hurricane Omar.

We've been studying the same species as this coral since before the hurricane, but we rarely find these baby corals, they're really rare.

actually listed as an endangered species

The baby coral in this picture, this little round polyp, is a few years old.

Fight algae overgrowth like a bleached cousin

I'm trying to live 1,000 years like my cousin on the northern coast.

What's happening in the world and in the oceans has changed our outlook.

In the short term, we can be very pessimistic and mourn what we've lost and what we've taken for granted.

But in the long run, we can still be optimistic, and still be ambitious about what we're trying to protect and what we expect from governments and nature.

Corals have lived on Earth for hundreds of millions of years.

survived the age when the dinosaurs went extinct

coral is amazing

(Laughter) Individual corals, if given a chance and preserved, can survive tremendous damage and fully recover.

Corals have been playing the long game, and now so are we.

thank you

(applause)

Today I'm going to talk about technology and society.

The Department of Transportation estimates that 35,000 people died in road accidents in the United States alone last year.

Worldwide, 1.2 million people die each year in road accidents.

If there was a way to eliminate 90% of those traffic accidents, would you support it?

of course you will

This is what self-driving car technology promises to deliver by eliminating human error, the leading cause of accidents.

Imagine yourself in a self-driving car in 2030, sitting back and watching this old TEDxCambridge video.

(Laughter) All of a sudden the car broke down and the brakes stopped working.

If you keep going straight, you'll run into a crowd of pedestrians crossing the street, but if you turn the wheel, instead of killing one person on the sidewalk, you can save several pedestrians.

What should the car do, and who should decide that?

Or what if you could veer off the wheel, run into a wall, and instead of saving the pedestrians, let the people inside the car die?

This scenario is inspired by the "trolley problem," which was devised by philosophers decades ago to consider ethical issues.

What matters is how we think about this issue.

For example, it is possible not to think at all.

Such a scenario is unrealistic, improbable and absurd.

But I think that kind of criticism takes the story too literally and misses the point.

Of course, real-world accidents don't work this way, because there are only two or three options in an accident situation, and in either case someone dies.

In practice, you're going to be calculating things like the probability that a car will run over each other, how the direction of the steering changes the risk to occupants, pedestrians, and other drivers.

The calculations will be much more complex, but there are still trade-offs, and trade-offs are ethical.

"Stop worrying about that

Let's wait until the technology is fully mature and 100% secure,' you might think.

Let's assume that in the next 10 years, we'll be able to eliminate 90 percent, or 99 percent, of those accidents.

But what if it took another 50 years of research to eliminate the remaining 1% of accidents?

Should we hold off on adopting this technology?

If the current situation continues, 60 million people will die in road accidents in the meantime.

Waiting until the technology is completely secure is an option, and it comes with trade-offs.

People on social media are coming up with all sorts of ways to keep this issue out of their minds.

One person pointed out that cars should just slide between pedestrians -- (Laughter) while avoiding people on the side of the road.

If you can do it, of course you should

We're interested in when you can't do that.

One of my favorites, one blogger suggested, is to hit the eject button and jump out of the car -- (Laughter) and let the car self-destruct.

(Laughter) So given that cars have to make trade-off decisions on the road, how do you think about those trade-offs and how do you make them?

Maybe we should do polls to find out what society wants, because regulations and laws are a reflection of society's values.

so i tried

Together with my collaborators, Jean-François Bonfon and Azim Sharif, we conducted a poll that presented a scenario that looked something like this.

We have two philosopher-inspired choices, Jeremy Bentham and Immanuel Kant.

Bentham would say that cars should follow a utilitarian ethic, that they should take actions that minimize the total amount of damage, even if those actions result in the death of pedestrians and occupants.

Immanuel Kant would say that we should act according to moral principles like "never kill."

We shouldn't take actions that intentionally harm people, and we should let the car go, even if more people are harmed as a result.

What do you think, guys?

Bentham or Kant?

Our research found that

The point is that most people have an opinion on Bentham's side.

Everyone seems to want cars to be utilitarian and minimize damage, so maybe we should.

problem solved

But this has a small pitfall

When I asked him if he would buy such a utilitarian car, he said, "Absolutely not."

(Laughter) I want a car that protects its occupants at all costs, but I want other people to buy cars that do the least damage possible.

(Laughter) I've seen this kind of problem before.

It's a problem called the social dilemma.

To understand the social dilemma, we need to go back in history a little.

In the 1800s, the English economist William Forster Lloyd published a pamphlet with this scenario.

There's a group of farmers -- British farmers -- who share a pasture for their sheep to graze.

Each farmer brings in the same number of sheep -- let's say three.

If one of the farmers brings in an extra cow, that farmer gets a little profit, but the others don't suffer.

But if every farmer makes the same decisions in their favor, the pasture will be over-consumed and depleted, which is a loss for all farmers and, of course, a loss for the sheep.

We see this problem everywhere, from the difficulty of preventing overfishing to reducing carbon emissions to mitigate climate change.

When it comes to regulating self-driving cars, communal lands are basic public safety -- which is the common good -- and farmers are the passengers and owners who choose to ride in those vehicles.

When everyone chooses to prioritize their own safety, the result is that the common interest of minimizing the total amount of harm is undermined.

This problem is traditionally called the "tragedy of the commons," but in the case of self-driving cars, the problem becomes a little more nasty, because you're not necessarily the one making those decisions.

An automaker might simply program the car to maximize customer safety, and the car might decide for itself that doing so requires a little more risk to pedestrians.

Now, if I use the sheep metaphor, it's like an electric sheep with a mind of its own.

(Laughter) And the sheep may go out to graze without you knowing.

Let's call it the "algorithmic commons tragedy," and it raises a new type of problem.

Traditionally, these types of social dilemmas have been resolved through regulation, where governments or communities come together to collectively decide what outcomes they want and what constraints need to be placed on individual behavior.

Then we ensure that the public interest is protected through oversight and enforcement.

So why not ask regulators to make harm minimization a requirement for all cars?

Because that's what everyone says they want

More importantly, you can be sure that it's fair. If you're going to buy a car that's the rare occasion that you're willing to sacrifice yourself, you don't want to be the only idiot while everyone else enjoys unconditional protection.

In our survey, when we asked people if they supported regulation, we found this:

First, people rejected regulation, and then they said, "If you're going to regulate like that to minimize the total harm, I'm not going to buy a car like that."

Ironically, trying to limit harm by regulating cars may end up causing even more harm, because people won't choose such technology, even if it's much safer than a human driver.

I don't have a definitive answer to this conundrum, but I think it's time for society to come together to find out what trade-offs we're willing to accept, and how we can enforce those trade-offs.

As a starting point, my two brilliant students, Edmund Awad and Sohan D'Souza, created a website called Moral Machine, where they randomly generate different scenarios and ask them to choose what the car should do in a series of random dilemma situations.

There are scenarios that vary from the age of the victim to the species.

Through this website, we have collected data on over 5 million decisions from over 1 million people around the world.

This helps people across cultures get a rough idea of ​​what trade-offs are good and what they're not.

And more importantly, things like this make people realize how difficult those decisions are, how hard choices the authorities are forced to make.

And it may help society understand the trade-offs that will one day be included in regulation.

In fact, I'm happy to say that the first regulations from the Department of Transportation, released last week, included a 15-item checklist that all automakers should put forward, and number 14 was ethical considerations -- how to deal with them.

We also encourage people to reflect on their decisions by showing them a summary of the choices they made.

I'm going to give you an example from someone.

This is the number one object saved (a cat) and the number one victim (a stroller) by this person.

(Laughter) Some of you may agree with this person.

But this person also tends to prioritize car occupants over pedestrians, and is happy to punish people who ignore traffic lights when crossing.

(Laughter) Let's summarize.

We started by asking the question of an ethical dilemma: what should a car do in a particular situation: go straight or turn.

But then I realized there was another question to ask.

It's a matter of what trade-offs are acceptable, and how society agrees and enforces them.

this is the social dilemma

In the 1940s, Isaac Asimov coined the famous "Three Laws of Robotics."

Robots must not harm humans Robots must submit to humans Robots must protect themselves This is in order of importance

Over the next 40 years or so, many stories emerged that pushed these principles to the limit, and Asimov added a zeroth principle that superseded the three: that robots should not harm humanity as a whole.

I don't know what this means in the context of self-driving cars or in certain situations, and I don't know how it's going to happen, but I hope that by recognizing that regulation of self-driving cars is not just a matter of technology, but also about social cooperation, we can at least start asking the right questions.

thank you

(applause)

(Laughter) (Laughter) It was "Spot Mini."

will appear again later

I- (Applause) I love building robots.

A long-term goal is to build robots that can do the same things that humans and animals do.

We are particularly interested in three things:

One is balance and dynamic mobility, the second is maneuvering while moving, and the third is perception while moving.

Let's start by demonstrating dynamic mobility and balance.

I'm standing here now, balancing.

So what about this?

(laughs) What if this?

(Applause) These basic abilities allow humans to go almost anywhere on the planet, regardless of terrain.

I want a robot to do this

What about operation?

I have the remote control in my hand right now, and I can operate it without any problems without looking at it.

But more importantly, you can move your body while holding this remote control, and you can stabilize your body, coordinate your body, and walk around.

What that means is that you can move around the world and extend your arms and reach, so you can handle just about anything.

This is the operation on the move

anyone can do it

The third is perception.

Now, I'm looking out over this room of more than 1,000 people, and thanks to my amazing visual system, I can see each and every one of you, and it's always stable in space, even when I move my head and move around.

This kind of mobile perception is very important for robots to go out into the world and move and act.

So let me give you a quick rundown of where we are in robot development towards these goals.

The first three robots I'll show you all have dynamic stability.

This is the "Big Dog" that we developed a little over 10 years ago.

Built-in attitude controller for stability

It also has multiple sensors and a control computer.

This is a cheetah-like robot that runs very fast. It recycles energy as it runs and hops on the ground.

This is a much larger robot that can use its legs to move through deep snow.

It was about 25 cm of snow, but there was no problem.

This is Spot, a new generation of robots, a little older than the robots I showed you on stage earlier.

What we've been chasing for a long time is drone delivery. People often talk about, "Can we deliver packages with drones?"

How about delivering with a plain old robot with legs?

(Laughter) So we're taking robots to employee homes to see if they can go inside themselves.

In fact, the Boston area is very diverse, with stairs and corners.

quite a challenge

But we're doing well, we're about 70 percent successful.

And that's where the moving maneuver comes in. I'm attaching an arm to the robot, and it's trying to find its way through the door.

The most important thing about building autonomous robots is not just doing what you tell them to do, but allowing them to deal with the uncertainties that arise in the real world.

Here, engineer Steve is being mean to robots.

(Laughter) With all this distraction, the program is still holding up and doing what it's supposed to do.

In this case, Eric is pulling the robot back with a string as it tries to climb the stairs.

It's really hard to get a robot to do what it's designed to do in these situations, but what you get is that you can apply it to other things, and you'll end up with a much more autonomous robot than if you hadn't.

This is the humanoid robot Atlas.

This is the third generation of humanoid robots that we are building.

I'll talk about the hardware design later.

So what we've been trying to do is try to get as close to human-level movement and speed as possible in common tasks, like moving boxes on a conveyor.

We're now at about two-thirds the speed of the average human.

This robot uses both hands, it uses its body, it uses its legs, and this is just an example of using dynamic stability, locomotion, and locomotion perception.

This is -- (Laughter) there are actually two Atlases.

(Laughter) Of course, not everything goes as planned.

(Laughter) (Laughter) (Laughter) This is the steering wheel of our latest robot.

The interesting thing about the handle is that it's an animal and something else, and it's divided by two, and there's something like this wheeled leg.

It's got an arm that's kind of weird, but it can actually do amazing things.

can carry 45kg

You can probably lift more than that, but I've only tried it up to 45kg.

It's good at rugged terrain, even though it runs on wheels.

And the steering wheel is nice looking.

(Laughter) (Applause) Let's talk a little bit about robotics philosophy.

A lot of people think that a robot is just a machine that follows the instructions of a computer, and the computer gets information through its sensors.

But that only shows one side of things.

In reality, while the computer is making suggestions to the robot, real-world physics are at work.

Physical things include gravity, friction, and collisions with other objects.

It's my belief that to build a good robot, you have to design it holistically, which means designing the software, the hardware, and the behavior all together, so that the parts can mesh and work together.

A perfect design creates true harmony, and these parts work well together.

So it's half software, half hardware, plus it has behavior.

Recently, we've improved the hardware in the direction that we're aiming for. The picture on the left is the design so far, with all the pieces glued together -- the conductors, the tubing, the connectors.

The right side is more integrated and looks like an anatomical map.

They're starting to use the magic of 3D printing to build robots that closely resemble animal anatomy.

This is the thigh, and it has hydraulic channels, actuators, and filters, but it's all 3D printed as one integrated part. To develop the overall structure, we first figured out what kind of load it would be under and how it would behave from the robot's recorded data and simulations.

So it's a data-driven hardware design.

By using such processes not only in the thighs but also in other parts, we are huge, rugged, crisp, and look bad -about 170kg on the right. The weight is less than 90kg, which is a little heavy than me. I can't show you yet, but it works properly -only 75kg on the left side has the same power and ability as before.

These improvements are happening at a fairly rapid rate.

Now, it's Spot's turn again. Let's take a look at his mobility, dexterity, and perception.

This is Seth Davis, and he's going to be taking care of the robot today. He's going to be piloting it with a controller, giving Spot rough instructions, but the computer on board the robot will do everything, like adjusting the leg movements based on sensor data.

Robots can walk at different cadences, and they have attitude controllers -- solid-state attitude controllers and inertial measurement units (IMUs).

Of course there are also batteries.

One of the features of legged robots is that they're omnidirectional.

You can go forward, you can go sideways, and you can rotate in place.

And this robot is a little boastful.

I would love to show you how to walk with a lot of movement, like running -- (Laughter) you can do this.

(Laughter) It would be really cool to be able to hop on one leg, but not yet.

So here's a set of cameras, stereo cameras, and that's what you see in the middle of the stage.

It's a little dark in the shots of the venue, but I'm going to show you how Spot uses this camera to look at the ground in front of him and jump over obstacles.

In this demo, Seth is piloting, but the robot does the planning itself, like where to walk.

So here's a topographic map, where the data from the cameras unfolds in real time to show you where you don't want to set foot in red, and green is where you're safe.

Now robots are turning blocks into stepping stones.

We're also adjusting our stride length to stay on top of the block. It takes a lot of planning to make this move, but we can do it in real time.

Now we're going to change the mode, and the robot will see the blocks as undulations on the ground, and as it moves along, it'll decide whether to go up or down.

This is how we dynamically balance and use perception while moving, because we have to coordinate our movements with what we see.

Spot has a robotic arm

It may look like a head and neck, but it's an arm.

seth is running

In fact, it's just the arm that's controlling it, and the movement of the body follows on its own.

As I said earlier, the two are working together, just like humans.

One of Spot's coolest specialties is the "chicken head mode."

(Laughter) But I'm not going to do that today.

(Laughter) Spot I'm a little thirsty, can you get me a soda?

Seth isn't piloting anything in this demo.

The robot has a LIDAR (laser ranging) device on its back, and the robot uses props placed on the stage to locate it.

I've reached the place now

Using the camera built into his hand, he finds the cup and picks it up - again, Seth isn't piloting it.

We've mapped out a path for the robot to take - it looks like we've gone astray, but now Seth takes control again, because it's a little uneasy to let him hand it over.

thank you spot

(Applause) Hey Spot, how do you feel after performing at TED?

(laughs) I agree.

(Laughter) Thank you, everyone. Thank you, Boston Dynamics. Thank you for all your hard work.

(Applause) (Helen Walters) Thank you, Mark.

I have a question for you.

You were talking about UPS and home delivery earlier.

What else do you think your robot could be used for?

(Mark Raibert) I think robots -- if you have the ability that I'm talking about -- would be really useful.

About a year ago, I went to Fukushima and inspected the site, and found that there is a great need to send robots to contaminated areas to assist with restoration work.

It won't be long before we see robots like this in our homes, and there's also a huge need to take care of the elderly and the sick.

In the not-too-distant future, we will be caring for our parents with the help of robots, or rather, our children will use robots to care for us.

There are many other things you can do

the possibilities are endless

There may be things you haven't thought of yet.

(Helen) What about the negative side?

For military use?

Interested?

Mark: Yes, the military has invested heavily in robotics.

But I don't see the military as the downside, because like any advanced technology, it has many uses.

(Helen) Thank you

(Mark) Nice to meet you

thank you

(applause)

I like art galleries and museums

Have you been to the Natural History Museum?

in New York City?

(Applause) I often take my kids to art galleries and museums.

The other day, I went to the Natural History Museum.

Take my sons Sabian and Davis

At the museum's main entrance is a stunning statue of Teddy Roosevelt.

you all know

Teddy Roosevelt, riding his horse with one hand, looks strong and brave, with his sleeves rolled up.

I don't know for sure, but my chest might be bare

(Laughter) To Roosevelt's left is a Native American --

On the right is an African-American man walking.

As we walked up the stairs to the statue of Roosevelt, my nine-year-old son said, "Dad, why is he the only one on horseback and the two of you are being forced to walk?"

I stopped when I heard that

My feet suddenly stopped

It's a long history, so it's hard to explain to children, but I always try to be as clear as possible.

But my son's question came as a surprise.

My son wanted to say, "It's not fair.

Papa that's not fair

How could something so unfair be placed in front of such a splendid facility?"

This got me thinking about how to rework sculptures in public places -- national monuments.

Is there a way to fix it instead of erasing it?

When I was little, I never got the chance to go to art galleries or museums.

It wasn't like that

My mother gave birth to me when I was 15.

amazing person

My father was a father and had a lot of troubles, so he didn't really care about me.

To tell you the truth, I got into art because of a woman.

An amazingly beautiful, smart woman, she was four years older than me, and I wanted to date her.

He said, "You're so young and you don't have a vision for the future."

So I ran to junior college, signed up for a few classes, and then ran back and said, "Look, you're thinking about your future."

(Laughter) "Will you go on a date with me?"

By the way, she's a really amazing person.

we got married

(Applause) When I ran to the junior college I randomly found and signed up, I didn't really care what classes I took.

(Laughter) And that's how I got into art history class, and I knew nothing about art history.

But when I got to class, something amazing happened.

For the first time in my life, I had the opportunity to use my visual talents in school.

it was the first time

The professor would often show a painting and ask, "Who is the artist?"

So I answer, "Van Gogh, obviously Van Gogh.

no doubt

(Laughter) I got a B in this class.

it was amazing for me

When I was in high school, I wasn't an excellent person.

GPA (grade evaluation value) is ".65"

(Laughter) First decimal point, then six, then five.

So getting a B was really, really big for me.

I realized that I had the ability to see things visually, and that I couldn't learn any other way, so from that point on, I approached everything the same way.

It's been a long time since I started, and it's going well.

I took an art history class back to back.

I will never forget the last class I took.

It was an art history class

Has anyone taken a course? It's about teaching an entire history of art in just one semester.

Cave paintings, Jackson Pollock, all of that stuff -- it's a class that's very hard to teach.

At the beginning of the semester, I looked at my class book, and out of 400 pages, there were about 14 pages about black people in painting.

Packed in there was a commentary on the black figure in the painting and the black painter.

Content is poor

(Laughter) But I was really excited, because it wasn't even mentioned in any of the other classes I'd taken.

I didn't talk about that at all.

So imagine my surprise in class on the day I was supposed to read that chapter, when my professor told me, "I don't have time today, so I'm skipping this chapter."

"Eh? Excuse me. Please wait, Sensei.

This chapter is very important to me.

Will you have a chance to read it later? ”

"Titus we don't have enough time"

"No, no, I'm really sorry, but it's something I need.

The author clearly considers this an important chapter.

Why are you skipping? ”

"Titus I don't have time"

"Okay, but one last thing—

Can I talk to the teacher later? ”

(Laughter) I went to the professor's office during office hours.

I ended up getting kicked out

If you go to the dean

I was told that the contents of the lecture cannot be forced.

That's when I realized that if I wanted to understand this history, if I wanted to understand the role of the people who were forced to walk alongside the horses, perhaps I had to figure it out for myself.

Now-

The slides shown here are by Frans Hals.

In an art history class, the skipped chapter had this image.

I was self-taught in painting, and I learned by watching these works in museums.

take another look

I drew this

I've changed a little -- (Applause).

You know there's a bit of a difference

All my life in art history made me realize that painting is a language.

For some reason, this man is in the most prominent position in the composition of the painting.

For some reason, the author has painted a gold necklace here.

It's trying to convey something about the economic status of the people depicted.

Painting is a visual language, and everything painted is meaningful and important.

is coded

Still, the placement and structure of the drawn elements—hierarchies in the composition—sometimes obscure other aspects.

And what this silk is trying to convey is that they're very rich.

And in art history, there are more mentions of dogs than of the people here.

From a historical point of view, if you study this kind of painting, you'll learn a lot about the lace that the woman in this painting is wearing, about how lace is made. How does that compare to the person here? his dreams and hopes, what he wants out of life

i want to show you something

Please don't think that erasure is the purpose

it's not

What I'm smearing in front of you is linseed oil.

It becomes transparent over time, so the painted face eventually shows through somewhat.

What I want to show you is just a little bit of a different way of looking at it.

What impact do these statues in museums have?

What would be the effect if the most vulnerable people in society were constantly shown themselves in this kind of painting?

I can't tell you to erase

This history cannot be erased

this is the reality we should know

When we think about this, we -- no, let's get back on track.

Remember old cameras? It's a camera that you manually focus on when taking a picture.

When you hold the camera and want to focus on you, turn the lens slightly to the left and your image will appear sharply.

If you turn the lens slightly to the right, you can also capture the person behind you sharply.

right here from now on

I want to give you the opportunity to-

I'm trying to answer that question my son asked me.

The paintings I want to paint, the sculptures I want to make - works that honestly address the struggles of the past while trying to speak to the diversity and achievements of the present.

Just erasing with an eraser won't make it happen

that won't work

What we should adopt is the same mechanism as the U.S. Constitution.

If something goes wrong and you want to change a provision of the constitution, you won't delete the old article.

Add an amendment clause to the original text, like, "It used to be like this, and now it's like this."

If we can do that, we should be able to understand a little more where we're going.

thank you

(applause)

Loneliness

Everyone here will experience loneliness at some point in their lives.

Loneliness doesn't come from loneliness, it comes from how socially connected you are to the people around you.

At this very moment, there are people who are surrounded by a thousand people and still feel lonely.

There are many factors that contribute to loneliness, but as an architect, I'm going to tell you that one of the factors that contributes to loneliness is the environment in which you live, the place you choose to live.

let's see this house

nice house

It's got a big yard, a fence, and a two-car garage.

This house may be in a town like this

For many people around the world, this house and this townscape may be a dream.

But this dream also carries the danger of immaterial ties and social isolation.

Yes, I know, some of you may be screaming in your mind, "This is my house and my neighborhood! I know all my neighbors!"

That is wonderful

Ladies and Gentlemen, How good is that? I'm sure there are quite a few of you here who live in similar circumstances but don't know your neighbors very well.

Even when you're greeting someone you know, you quietly ask your partner, "What's this person's name?"

It's to emphasize the familiarity by calling them by name.

Social media is one of the sources of intangible connections.

It's a very familiar sight

In an elevator or at a cafe, I look around and everyone is playing with their smartphones.

Even if you're not looking at your email or Facebook, everyone around you is on their smartphones. Have you ever had this experience? You met someone's eyes, smiled, said hello, and they took off their earphones and said, "Excuse me, did you say something?"

i feel so lonely

I want to talk to you today about a prescription for loneliness.

nothing new

It's an ancient way of life that is still practiced in many countries outside the West.

About 50 years ago, Danes came up with a new name, and since then, tens of thousands of Danes have lived in ties with each other.

This way of life is spreading across borders among people seeking community.

This concept is co-housing

It means cohabitation, living in groups with the purpose of getting to know each other and helping each other.

In co-housing, you have your own home, but you share a lot of space both inside and outside.

Before I show you an example of co-housing, let me introduce you to my friends Sheila and Spencer.

When they first met, they were in their 60s, and Spencer was nearing the end of his long stint as an elementary school teacher.

He didn't want to lose contact with his children after he retired.

two are my neighbors

This co-housing community was designed, developed and built by me.

In this community, we consciously engage in social interaction.

let me guide you

From the outside, it looks like a typical small apartment building.

It's exactly the same construction as the apartment next door, except that it's lemon-colored.

The rooms inside the building are also very common.

Each room has a living room and a kitchen, a bedroom and a bathroom, and there are nine families around a central courtyard.

This is my home This is my home Spencer and Sheila

It's not the rooms that make this building co-housing, but rather the activities that take place here, the social interactions that take place both inside and outside the central courtyard.

I look out the window for Spencer and Sheila.

In fact, every morning you can see Spencer waving cheerfully as he prepares breakfast.

Looking down at the courtyard from our house, depending on the season, you can see this kind of scenery. Children and adults are playing and relaxing in various combinations.

I hear laughter and talking

I often see hula hoop play

Sometimes I say, "Don't piggy me!"

Children's voices can sometimes be heard

This is the sound of everyday life for us, it's the sound of social connection.

At the back of the courtyard is a double door that leads to the common house.

I think the secret to co-housing lies in the common house.

And that's because it's where social interaction and community life begins, and that's where it all spreads out.

The common house has a large dining room, large enough to seat all 28 residents and guests, and we eat together three times a week.

It is equipped with a large kitchen, and the dishes are prepared in groups of three in turn.

There are 17 adults, so I'm in charge of cooking once every six weeks.

The other two times I'll help the team set up and clean up.

other days just go

At the dinner table, I talk to my neighbors, I take care of my vegetarianism, and I leave with a delicious meal that someone has prepared for me.

Our nine families live like this by choice.

At the end of the American dream, I wanted to choose co-housing rather than living in a detached house, which could lead to isolation, and strengthen social ties.

A shared intention to live together is the starting point of cohousing.

It's this intention that makes cohousing so different from other ways of living.

Intent is hard to see, it's hard to show, but I'm an architect, so I'd like to see more pictures.

Here's an example of how intent was expressed in some of the communities I visited.

The furniture, lighting, and room acoustics are well thought out so that people can eat together comfortably; the location and visibility of children's play areas in and around the common house are considered;

What is "communitas"?

It's a tricky social science term for "community togetherness."

In visiting more than 80 communities, my measure of communitas became, "How often do you eat together?"

How often we eat together is, of course, up to each group's preferences, but some communities have been eating together every night for 40 years.

Others only bring in once or twice a month.

From my observations, where we eat together more often, communitas is also at a higher level.

It turns out that eating together makes it easier to plan things together.

Share more when you eat together

look after each other's children

We lend and borrow tools and each other's cars.

But as my daughter often says, cohousing is far from a pipe dream, and I'm not on good terms with everyone in the community.

Sometimes there are differences and conflicts

But in co-housing, relationships are also intentional.

try to resolve the differences

Be considerate, speak out, share personal thoughts, apologize when necessary.

Some people are skeptical that the idea of ​​co-housing will only appeal to a small percentage of people.

i agree with that

If you look at Western cultures around the world, only a small percentage of people live in co-housing housing.

We need to change this. Our very lives are at stake.

In 2015, a Brigham Young University study found that the risk of premature death was greatly increased among people living alone.

And the US Surgeon General has declared the isolation epidemic from a public health standpoint.

This epidemic is not confined to America.

So when I said earlier that cohousing is the cure for loneliness, I should have said that cohousing might save lives.

If I were a doctor, I would say, "Take two aspirin and call me in the morning."

But I'm an architect, so I'd like to say, "Take a walk with your neighbor, have a meal with them, and call me in 20 years."

thank you

(applause)

Twenty-four years ago, I was invited to serve as art director at The New Yorker magazine with the goal of rejuvenating a system that was a little old-fashioned at the time, and bringing in new artists to bring the magazine out of its ivory tower and build a connection with the times.

This was the perfect job for me, because I've always been drawn to just one image, how one simple illustration bursts through the flood of images I see every day.

Because it's how images capture the moment — and how they articulate social trends and complex events in ways that words can't, extracting their essence and turning them into cartoons.

So I went to the library and saw the cover of the first issue by Lee Irvin in 1925, an illustration of a gentleman looking through a pair of glasses at a butterfly, nicknamed "Eustus Tilly."

As The New Yorker magazine became known for its exhaustive research and long-form writing, I noticed that the humor was fading away. Because Eustace Tilly is now considered arrogant and snobbish, in fact, when Lee Irvine first drew this illustration in 1925, it was intended as a humor magazine cover to please the youth of the time—the uninhibited tomboys of the Roaring Twenties.

In that library, I found an illustration that perfectly captures the Great Depression zeitgeist.

It wasn't just about how people dressed and how cars looked, but what people saw and laughed at and what their prejudices were.

I really got to know what it was like to live in the 1930s.

So I brought in contemporary artists, Adrian Tomine is one of them.

I often approached storytelling artists -- cartoonists and children's writers -- and asked them to send me sketches on a variety of themes, like what it's like to be on the subway or Valentine's Day.

Once that sketch is approved by editor-in-chief David Remnick, that's the go-ahead.

I like that image without imposing a way of thinking.

It's something that makes the viewer think, because the artist... the illustration is like a puzzle.

In order to understand the illustration of Anita Kunz on the left and Tomar Hanukkah on the right, you have to spot the differences.

And what is this...

What excites me the most is how we can connect with our readers.

It's about seeing how these illustrations play with stereotypes.

Understanding that changes the stereotypes in your head.

But illustrations don't always represent people, they can also represent emotions.

It was right after 9/11, and I'm sure it was for everyone. At that time, I didn't know how to make sense of what we were going through.

So when I told my husband, the cartoonist Art Spiegelman, that I was thinking about making that suggestion, he said, "If you're going to make the cover black, why don't you draw the silhouettes of the Twin Towers in black on a black background?"

So I sat down at my desk, and when I saw the finished product, I got chills down my spine, and then I realized that by refusing to paint, I was able to express a sense of loss, grief, and emptiness.

In the process of creating this cover, I learned something very profound, that sometimes images that speak so eloquently can be achieved through very restrained means --

And a simple image can say a lot.

Now, this illustration by Bob Stark captures a historic moment shortly after Barack Obama was elected president.

But I can't prepare a draft, because to do it this way, the writer has to feel what everyone else feels in the middle of the event.

So, this was the only illustration that we were able to run during the November 2016 presidential election, and it was on the newsstands during Election Week.

[Oh God, no.] (Laughter) Because I thought some people would feel this way -- (Laughter) when the election results came out.

When the results came out, we were at a loss. This is also an illustration by Bob Stark, and it's very compelling.

And yet, we don't know what the future holds. Again, we didn't know what to do, but we kept going anyway. This was published after Donald Trump was elected president, as women marched across America.

Now, over the past 24 years, I've seen over a thousand illustrations come to life every week, so I'm often asked what my favorite is, but I can't pick just one. My greatest pride is that each illustration is different.

And that's because of the talent and diversity of the contributing artists.

And now -- the focus is on Russia, where -- (Laughter) in this piece by Barry Britt, it's Eustace "Vladimirovich" Tilly.

The butterfly is none other than the astonished image of Donald Trump flapping its wings and trying to figure out how to control the "butterfly effect." Lee Irvin's famous 1925 logo is also in Cyrillic.

Now what I'm really excited about is...

Freedom of the press is essential to democracy.

Whether sublime or absurd, we find that artists have the power to capture the present. Artists, with nothing but ink and watercolor, capture the time and initiate a cultural dialogue.

This dialogue puts them at the center of the culture, and I think that's where they really belong.

Because what we need now is "good comics"

thank you

(applause)

A decade ago, computer vision researchers thought it would be nearly impossible for a computer to tell the difference between a dog and a cat, despite major advances in artificial intelligence.

We are now able to distinguish between them with greater than 99 percent accuracy.

It's a problem called "image classification," where you ask a computer to label an image so that it can identify thousands of things.

I'm a graduate student at the University of Washington, working on a project called Darknet, a neural net framework for training and testing computer vision models.

Let's see what the Darknet thinks of that dog image.

And when you run that image through our image classification program, it can tell you not only whether it's a dog or a cat, but also a specific breed.

I'm getting to know the details

And they give the correct answer [37% Malamute 15% Husky 12% Eskimo]

My dog ​​is definitely a malamute [malamute 37% husky 15% eskimo 12%]

We've made incredible progress in image classification, but what happens when we put these multi-object photos through image classification?

Result is-

Almost the same as before [7% Malamute 6% Eskimo 6% Husky]

You're right, there is indeed a malamute dog in the image, but the label alone doesn't tell us much about what's going on in this image.

I want something more powerful

I'm working on a problem called "object detection," and it's the problem of looking at an image and detecting all the objects in it, putting a box around each one, and identifying what it is.

Let's run this image through an object detection program and see what happens.

The result is something like this, you can do a lot of things.

I know there is a cat and a dog

You can also see the relative position and size.

There is also extra information

there's a book over there

If you're trying to build a computer vision system, a self-driving car or a robot, this is exactly the kind of information you want.

I want something that allows me to interact with the world around me.

When I started working on object detection, it took 20 seconds to process a single image.

To give you an idea of ​​why speed is important in this domain, let's look at what happens when object detection takes two seconds to process an image.

That's 10 times faster than an image detection program that takes 20 seconds per image, but by the time the program comes up with the answer, things have already changed, so it's not very useful for applications.

Let's speed it up another 10 times. We're processing 5 frames per second.

It's a lot better now, but when there's something big going on, there's a lag, and I don't want a system like this driving my car.

This is our object detection system running in real time on a laptop.

It follows me smoothly as I move around.

very good

This is what you want when you want to build a computer vision system.

(Applause) In just a few years, we went from 20 seconds per image to 20 milliseconds per image, a thousand times faster.

How did it come true?

Previous object detection systems received an image like this, divided it into a number of regions, ran each region through a classifier program, and assumed that an object was detected where it scored high.

This approach would require thousands of runs of the classification program and thousands of evaluations by the neural net for a single image.

Instead, we trained one neural net to do all the detection.

It generates the bounding boxes and the probability of classification confidence all at the same time.

Instead of looking at the image thousands of times, our system looks at it only once to do object detection, hence the name YOLO (You Only Look Once).

This speed allows us to process not only images but also video in real time.

Not only can it detect a cat and a dog, but it can also see each moving around and reacting to the other.

This detection program has been trained on 80 objects in Microsoft's COCO dataset.

If you have everyday items like spoons and forks,

There are also more unusual animals Cars Zebras Giraffes

let's do something fun

I'll try to see what I can detect from the audience.

Who wants a stuffed animal?

There are teddy bears everywhere

Let's lower the detector threshold a bit so we can detect you in the audience.

Can you detect a "stop" sign?

I have several backpacks.

let's zoom in a little more

That's excellent

All processing is done in real time on your laptop

The important thing is that this is a universal object detection system, which can be trained on any region of the image.

The same program that a self-driving car uses to detect stop signs, pedestrians, and bicyclists can be used to detect cancer in a tissue biopsy.

Researchers around the world are already using this technology to advance medicine and robotics.

I read in the newspaper this morning that Nairobi National Park is using YOLO as a detection system for animal census.

Because Darknet is open source, public domain, so anyone can use it for free.

(Applause) We wanted to make object detection technology more accessible and easier to use by combining model optimization, network binarization and approximation to make it work on smartphones.

(Applause) I'm so excited that we now have such a powerful solution to this basic computer vision problem that anyone can use it to create something.

The rest is up to you and the people around the world who can use this software.

thank you

(applause)

I was 41 years old when I first felt fear.

I've always been told I'm brave

As a child, I used to climb the tallest trees and approach any animal without fear.

i loved the challenge

My father used to say, "Good steel can withstand any temperature."

When I entered Colombia's political arena, I thought I could withstand any temperature.

I wanted to end corruption, I wanted to break the link between politicians and drug traffickers.

I was elected in my first election because I singled out a corrupt politician that no one could have touched.

He also accused the president of having ties to drug cartels.

Then I started getting threats

I had to get my young children out of the country, and one morning I smuggled them to the airport in the French Embassy's armored car.

A few days after that, I was targeted in an attack, but I escaped.

The following year, I was elected to parliament with the largest number of votes supported by the Colombian people.

I think people admired my courage

I thought I had the courage

but it's not

It's just that I've never experienced real fear.

That changed on February 23, 2002.

I was campaigning with a campaign promise as a candidate for the presidency of Colombia when a group of armed men blocked my path.

they wore military uniforms

I looked at the boots and they were made of rubber.

The Colombian army must be wearing leather boots.

That's how I found out they were guerrillas from the Revolutionary Armed Forces of Colombia (FARC).

After that, it was a blink of an eye

The unit commander ordered us to stop the car.

Meanwhile, one of the man's subordinates stepped on an anti-personnel landmine and was blown away.

It landed sitting straight in front of me

We exchanged glances, and it was only then that the young man realized that his rubber boots had landed far away with his legs still in them.

(sigh) he started screaming like crazy

To tell you the truth, I relived those feelings, and I still feel them now, and in that moment something started to break inside me, and his fear was contagious.

My head went blank, I couldn't think of anything, I felt paralyzed.

When I finally came to my senses, I thought, "I'm sure they'll kill me, and I won't even be able to say goodbye to my children."

As they dragged me deep into the jungle, the FARC soldiers said they would kill me if the government didn't negotiate.

And I knew very well that the government would not negotiate.

From then on, I would go to sleep in fear every night, sweating, shivering, and suffering from stomach pains and insomnia.

But what happened to my psyche was worse than that. I lost my memory of the names, addresses, phone numbers, and even the most important events of my life.

I started to doubt myself, I doubted my state of mind.

Doubt led to helplessness Helplessness led to despair

We experienced well-known behavioral changes, not just paranoia due to temporary panic.

It was distrust, hatred, and murderous intent.

I realized this when I was collared to a tree.

That day, I was left outside in a tropical squall.

I really want to go to the toilet

"Whatever you do, do it right in front of me," the guard man yelled.

That's when I thought I was going to kill the man.

The days that followed were full of plans, of chances, of ways, full of hate, full of fear.

And then all of a sudden, I got up and got out of that state, and I thought, 'I'm never going to be like those guys.

don't be a murderer

I still have the freedom to decide who I want to be."

That's when I learned that fear is about facing yourself.

I'm forced to follow my energy, follow my highest point

I learned that facing fear can be an opportunity for growth.

I have a lot of emotions when I tell this story, but when I look back, I can clearly identify the steps I took.

I would like to talk about three of them.

The first step is to let principles guide you.

Because I've learned that by following my principles, even in the midst of panic and thoughtlessness, I can do the right thing.

I remember well my first night in a camp built by the guerrillas in the middle of the jungle, with four-meter fences, barbed wire, lookouts at the four corners, and soldiers pointing guns 24 hours a day.

On the first morning, a man came up and yelled, "Number! Number!"

The other hostages, startled, woke up and took turns saying their numbers.

But when it was my turn, I said, "Ingrid Betancourt.

If you want to check if I'm there, call me by name."

The anger of the guards was nothing compared to the anger of the other hostages.

But for me, protecting my identity was more important than fear, and I couldn't allow myself to be treated as an object or a number.

This is one of the principles of protecting human dignity.

But don't get me wrong, the guerrillas were very -- well-analyzed. They'd been doing kidnappings for years, and they'd developed a tactic to break people down and divide them.

So the second step is to learn how to build cooperation and trust and come together.

the jungle is an alien place

It's a world of shadows and rain, filled with the sounds of countless insects, red ants and sandbar ants.

There wasn't a single day in the jungle where I didn't scratch myself.

And of course there are tarantulas, scorpions and anacondas.

I once came face to face with an eight-meter tall anaconda that could have swallowed me in one gulp.

and a jaguar

But none of those creatures did more harm than humans.

the guerrillas terrified us

spread rumors

It has caused betrayal, jealousy, hostility and mistrust among the hostages.

The first time I took a long escape, I was with Lucio.

Lucio was held hostage two years before me.

We decided to tie our bodies together with ropes to give us the strength to navigate the dark rivers of piranhas and alligators.

What we did was hide in the mangroves during the day

At night, we would leave, swim in the river, and ride the currents.

It went like that for a few days

But Lucio got sick.

He had diabetes and fell into a diabetic coma.

That's why I got caught by the guerrillas.

But living with Lucio, sharing our fears, we bonded, and no punishment or violence could ever separate us.

What is certain is that the guerrillas' day-to-day operations were so toxic, and even today, some of the hostages from that time still carry on the tensions of those times and channel the poison of the guerrillas' creation.

The third step is very important to me, and I want to share it with you.

The third step is how to deepen your faith.

I have a story to explain to you. John Frank Pinchao was a cop who was held hostage for over eight years.

he was known among us as the big wimp

But Pincho—I used to call him "Pincho"—pincho decided to run away.

and asked me for help

I had the title of master when it came to escape attempts.

(Laughter) So we started, but we had to delay the plan, because Pincho had to learn to swim first.

The preparations had to proceed in total secrecy.

One afternoon when we were all set up, Pincho came up to me and said, "Hey Ingrid, if you've been twirling through the jungle and can't find your way out.

What should I do? ”

"Pincho, pick up the phone and call someone upstairs."

"But I don't believe in God"

"God doesn't care, he'll still help you"

(Applause) It rained all night that night.

The next morning we all woke up in a commotion because Pincho had escaped.

The guerrillas made us evacuate the camp.

We started moving, and on the way, the guerrilla boss told us that Pincho was dead, and that he had found a carcass eaten by an anaconda.

It's been 17 days since then, and I'm sure I counted them, because those days were torture for me.

But on day 17, news came over the radio that Pincho was free and alive.

This is what he said first, "I know my fellow hostages are listening to this.

Ingrid, I did what you said.

I called out to someone upstairs and he sent a patrol to rescue me from the jungle."

this was a great moment because

Fear is contagious

Because faith is also contagious

Faith is neither rational nor emotional

faith is a will

faith is the will

Faith enables us to change all things in ourselves, turning our weaknesses and weaknesses into strengths and strengths.

a true transformation

It empowers you to stand up in the face of fear and see beyond.

I hope you remember that, because when the storm is raging around your boat, we all need to tap into that power that we all have within us.

After years and years and years, I'm finally home

When they handcuffed us and hauled us to the helicopter and we got out of the jungle, it all happened just as quickly as when we were abducted.

The next moment, the guerrilla commander was lying at his feet, gagged, and the leader of the rescue team shouted, "We are the Colombian army.

You are all free."

The cry that came out of us when we regained our freedom still shakes me to this day.

Now I know they can divide us, they can manipulate us with fear.

Colombia's failed peace referendum, Brexit, the idea of ​​building a wall between Mexico and the United States, Islamic terrorism, all of this is the political use of fear to divide people.

we all feel fear

But we can avoid being taken in by using the resources we have -- principle and unity and faith.

Fear is part of human nature, it's necessary for survival.

But above all else, it guides us in building our identity and personality.

At 41, I was terrified for the first time, and it wasn't my choice.

It was my choice what to do with my fear.

You can live crawling with fear.

But we can also overcome our fears, stand up and spread our wings, soar high, high, high, and reach the stars that everyone wants to go to.

thank you

(applause)

Imagine - driving 19 hours to take two kids to Disney World.

You've only been on the road for 15 minutes, and almost every time someone asks, "Are you still here?"

(Laughter) Every time, the answer is always the same: "Not yet." But it will come.

Have a very, very "fun" time

I'll be back home in another 19 hours.

But when I got back, the police were waiting.

I'm accusing you of committing a crime, even though you were in Florida when the incident happened.

To anyone who will listen, you say, "I didn't do it!

I can't!

I was having fun with Mickey and Minnie with my kids! ”

but no one believes

Eventually you will be arrested, tried, found guilty, and sentenced.

After 25 years in prison, someone finally finds evidence to prove that you were in Florida when the incident happened.

Therefore

For several years now, as a professor at Harvard Law School, I've been trying to help innocent people who have been wrongly convicted. For example, Jonathan Fleming spent 24 years and eight months in prison after being convicted of a murder in Brooklyn, New York, even though he had gone to Disney World with his children.

How can we prove it?

In what he had in his back pocket when he was arrested, there was a receipt -- a dated receipt that showed he was at Disney World.

It was in the police file, and there was a copy in the prosecutor's file, but it never got to the public defender.

In fact, no one noticed the existence of the receipt

Untouched for over 20 years

My team, who was looking through the files, found the receipts and re-examined the case, and it turned out that the culprit was someone else.

Mr. Fleming was indeed at Disney World, so now he's free.

Let me explain a little more

I got a call from the Brooklyn District Attorney about three years ago.

I was asked if I would be interested in working on a system called the Conviction Review Unit.

I replied "I will"

A conviction review unit is basically set up in the public prosecutor's office, where prosecutors review past trials to see if there are any errors.

In the first year, we uncovered about 13 wrongful convictions and released everyone who had spent decades in prison.

That's the highest number in New York history.

The program is still running, and so far, 21 people have been released -- people who have spent many years deprived of their liberties.

Let me introduce you to some other people that I met through this program.

One of them is Roger Logan.

After 17 years in prison, Mr. Logan wrote me a letter.

It was very simple: "Dr. Sullivan, I'm innocent. I've been made up.

Could you look into my case? ”

At first glance, it seemed like a very simple case, but in the cases I've investigated so far, it's easy to go wrong with a case involving only one eyewitness.

That alone doesn't mean he's innocent, but it does mean that it would be good to investigate the case a little more closely.

so i did

the facts were relatively simple

A woman witness said she heard gunshots, ran to the next building, and when she turned around saw Mr. Logan.

Mr. Logan was found guilty and spent over 17 years in prison.

But there was only one eyewitness, so we checked again.

I sent people to the scene to find out, and there was something that didn't make sense.

I'll try to be gentle, but even Usain Bolt wouldn't have been able to run from one witness to another.

May I?

So I found out that the testimony was not correct.

That doesn't mean I'm still innocent, but I found the witnesses to be unreliable.

So I went through the files and there was a document with a number on it.

It's a number that indicates the existence of a witness record.

We went back 20 years to dig through the undigitized documents to see what they were, and what we found was that the female witness was incarcerated on the day she saw the murderer.

Logan spent 17 years in prison.

And the last thing I want to mention is the case of two boys, Willie Stucky and David McCallum.

They were 15 years old when they were arrested, but their convictions were overturned 29 years later.

This case also seemed quite simple at first glance.

the two confessed

But research to date suggests that the confessions of boys without their parents present are very unreliable.

DNA testing has shown this over and over again.

so we investigated

A review of the transcript revealed that there was something in their confession that they had no way of knowing.

Only the police and the prosecutor knew that

Now I know what really happened, someone made them say that.

We don't know who it was or what it was, but anyway, we decided that he was coerced into confessing.

Then, after another forensic investigation and a thorough investigation, we found two other people who were much older, different heights, different hairstyles, and the real culprits.

I went to court that day and attended a "cancellation hearing," where the conviction was canceled.

I went to court because I wanted to see - Mr. McCallum walking out of court.

So I went to court, and the judge's words were the same as always, but this time they had a special meaning.

After reading out the verdict, the judge looked up, called out, "Mr. McCallum," and uttered the wonderful words, "You are now free."

Can you imagine?

After nearly 30 years, "You are free."

he left the court

Sadly, another defendant, Mr. Stuckey, was unable to walk out.

Mr. Stuckey died in prison at the age of 34, and his mother sat in the defendant's seat instead.

I will never forget this moment

His mother rocked her body and said, "I knew it wasn't that girl.

I knew it wasn't that girl."

Certainly not her son

that's what the other two did

In our work to review the integrity of convictions, what I've learned is that justice doesn't happen by itself.

It's the people who make justice happen.

Justice isn't just something that falls out of the sky and makes everything right.

He didn't die in prison if justice was to come.

Justice is done by people with good intentions.

justice is determination

justice is determination

we are the ones who bring justice

The chilling thing about the three incidents I've just told you about is that if you'd only spent one minute -- one extra minute and someone had just gone through the files, they would have found the receipt.

I wish I had just one more minute to go through the files, find the receipts, and give them to the public defender.

I wish someone had just spent a minute watching the confession tape and saying, "It can't be."

it's only a minute

Then Mr. Stucky would still be alive.

i remember one of my favorite poems

Benjamin Elijah Mays often retells a poem entitled "God's One Minute."

It goes something like this: "I have only one minute, there are only 60 seconds, I am forced into it, I cannot refuse it, I neither seek it nor choose it.

but i use it

If you lose it, you suffer; if you waste it, you need an explanation.

It's just a minute, but there's eternity there."

If I were in a position to dictate, I would say to everyone, "Every day, just one extra minute of your time, do what's right."

You don't have to push yourself -- there are people who make it their life's work, like public defenders who do justice every day.

But no matter what profession you're in, I want you to stop and do a little bit of justice.

I want a better atmosphere in the workplace

Please speak up instead of laughing when someone says or acts sexist

If someone is depressed, please lift them up. If you spend just one extra minute every day, society will be a very good place.

I have something to show you

This is David McCallum here.

This is a picture of the day I was released from prison.

After 30 years, I was finally able to embrace my niece, whom I had never been able to touch before.

Then I asked him, "What do you want to do first?"

"I'd rather just walk down the sidewalk without anyone telling me where to go," he replied.

It wasn't hateful, I just said I wanted to walk down the sidewalk.

I spoke to Mr. McCallum two weeks ago.

i went to new york

It was just my second anniversary as a free man.

We talked and laughed and hugged and cried

life seems fine

One thing he told us when he met us was what he's been doing all his life right now -- to make sure no one gets detained unjustly.

Ladies and gentlemen, justice is determination.

thank you

(applause)

touch your face

here you go

what do you feel

soft? Punipuniru?

It's your face. Can you feel yourself?

it's a bit different

We're actually touching thousands of microbes that live on our faces and fingers.

It flew down from the vent - you're probably touching the fungus.

May cause allergies or a musty odor

We're also exposed to the 100 billion bacteria that live on our skin.

It feeds on sebum and multiplies, causing body odor.

You may also be touching the bacteria in your faeces that flew into the air when you flushed the toilet earlier.

I feel a little sick

(Laughter) I may have given you a high-five to two types of mites that live on your face, and they're on everyone's face.

These mites crawl on your face at night and have sex on your nose.

(Laughter) A lot of it must be excreting in your pores.

(Laughter) Now look at your fingers.

how are you feeling? feel ill?

In the mood for soap or bleach?

You think so now, but you probably won't think so in the future.

For the past 100 years, we've had an adversarial relationship with the microbes around us.

If you had bugs in your house or germs in your sink, you had an artificial solution to eradicate them, kill them, kill them.

In today's world, we strive to eliminate most microbes.

By doing so, we're missing the source of new technology on this planet.

The last 100 years have brought artificial solutions to microbial problems, but the next 100 years will bring microbial solutions to human problems.

I'm a scientist, and I'm working with researchers at North Carolina State University and the University of Colorado to study the ecology of the microbes around us in familiar, not-so-interesting environments, like under the couch, in the backyard, in the navel.

I started this research because I realized how little I knew about familiar microbes.

Until a few years ago, no scientist knew what kind of bugs and microbes lived in our homes.

So we're working together, armed with cotton swabs, tweezers and new DNA technologies, to uncover the ecology of familiar microbes.

In the process, we've discovered that there are actually 600 species of insects living in American homes, ranging from spiders and cockroaches to feather mites.

And in fact, we've found over 100,000 types of bacteria and fungi lurking in dust accumulations, and many more in our clothes and showers.

We went further and looked at the microbes that live inside the insects in our homes.

Inside the body of an insect -- a wasp, for example -- there's a jungle of microorganisms in a dish -- hundreds of active creatures.

Explore the universe of biology!

Many of the things you see now don't even have names yet.

Many of the organisms around us are unknown.

I remember the first time I discovered a new species and named it.

It was a fungus that lives in paper wasp nests.

It's white and fluffy, and I named it Mycor naidicola, which is Latin for "dweller of others' nests."

Here's a picture of how they were bred into dinosaur dolls, because we all love dinosaurs.

I was in graduate school at the time, and I was so excited to discover this new life form.

I called my dad and said, "Dad! I've discovered a new species of microbe!"

My father laughed and said, "Wow, did you find a way to get rid of it?"

(Laughs) "Exterminate"

My father has supported me more than anyone else, and the moment he asked me to get rid of the life forms I had discovered, I realized I hadn't communicated well, both as a daughter and as a scientist.

During all these years of toting around in laboratories and in other people's backyards, studying and classifying familiar microbes, I failed to communicate my true mission.

My goal isn't to find a technology that kills familiar microbes.

My goal is to turn microbes into technology that works for humans.

In fact, there are over 100,000 new species living in our homes.

There are 100,000 new solutions to human problems.

You might think that there's nothing this tiny, one-celled organism can do, but it can be done.

These creatures are microalchemists, capable of transforming their environment through a variety of chemical reactions.

These creatures can live anywhere on the planet, and they can survive whatever they eat.

We can eat toxic trash and plastics, we can produce oils, battery fuels, and more, and we can even produce tiny pieces of real gold.

Transforming inedible food into nutrients

you can turn sugar into alcohol

It can add flavor to chocolate and nourish the soil.

Let me just say that in the next 100 years, these microbes will solve many of our problems.

There are many issues to work on

There are also everyday problems such as bad smelling clothes and tasteless food.

There are bigger problems, like disease, pollution, war.

And that's my mission, not just to study and classify familiar microbes, but to discover the unique and useful aspects of them.

let me show you an example

First, we looked at the pest, the hornet, which lives in many homes.

This little-known microbe taken from the hornet's body has a unique ability: it can make beer.

This ability is found only in a very small number of organisms on Earth.

In fact, any commercially brewed beer you've ever tasted is likely using one of these three microbes.

But the microbes we found can make honey-flavoured beer, and it can also make beer with a pleasantly sour taste.

In fact, this microbe that lives in the body of a wasp can produce more sour beer than any other creature on earth.

Now there are four types of yeast that can be used commercially to make beer.

What used to be just a pest now creates the beer of the future.

The second example is that I and other researchers dug up the dirt in the backyards of people's homes.

So we discovered a microbe that could create a new antibiotic, an antibiotic that could kill the world's worst super-resistant bacteria.

Doesn't that sound like a great discovery, but let me tell you a secret: in the last 60 years, most of the antibiotics on the market have come from similar bacterial species found in soil.

Every day, you, me, everyone here, everyone on this planet, lives are saved by antibiotic-producing soil bacteria.

What I thought was soil now looks like medicine

My favorite example comes from a colleague who studies microbes in pond dross, which, unfortunately, was found in cow dung, hence the name.

It seems trivial and not even worth talking about, but researchers have discovered that if you give it to mice, it can be a vaccine for PTSD.

It becomes a vaccine against fear.

Hope can be found in what used to be only the slag of the pond.

There are many, many more examples of microbes than we have time to talk about today.

I've shown you a solution that comes from just three species, but think about the possibility of 100,000 more microbes in the dust mass.

In the future, microbes may make us sexier, smarter, and longer-lived.

look at your fingers again

Think about the microbes we don't know about yet.

What can be achieved in the future? What can be created? Whose lives can be saved?

What do you think when you look at your fingers now?

Are you feeling strong?

It's because I felt the future with those fingers

thank you

(applause)

My son and my iPhone were born three weeks apart in June of 2007.

By the time the new-to-the-spot type of people were lining up outside waiting to get their hands on this amazing new gadget, I was stuck at home and had my hands full with something else, one that constantly sends notifications.

In fact, I was walking 15 to 25 km a day, and my postpartum weight disappeared.

I was lucky in this regard

but! i was bored

Before I became a mother, I was a journalist when the Concorde plane crashed.

He was one of the first to land in Belgrade when the revolution broke out in Serbia.

I'm exhausted now

This wandering life continued for weeks

But after about three months, something changed.

As I walked with heavy steps, my heart wandered here and there.

I started imagining what I would do when I was able to sleep like sleep.

As my son's crying subsided, I finally got my iPhone and did what I've been dreaming about.

I made my dream come true by hosting a public radio show.

I don't have to rush to the battlefield anymore, but thanks to my new smartphone, I can be a mother and a journalist at the same time.

You can watch Twitter while you're in the park, at the same time.

Just when I thought, smartphones became the center of my life, and I hit a wall.

Imagine, to host a podcast show, you have to prove that public radio is worth investing precious money in.

My goal was to increase the number of viewers tenfold.

One day, I sat down and brainstormed, as you do, but I had no idea.

This is not a writer's impasse, is it?

It's not like there was anything waiting to be unearthed.

it was just empty

So I looked back, when was the last time I had a good idea?

Yes, it was when I was struggling with that stroller.

Now all my spare time was full of smartphone time

Check the news headlines while you wait for your latte.

Update your calendar while you're sitting on the couch

If I have time, I'll text them and show my co-workers and my beloved husband how responsive I am.

It was boring and nothing at all

Is it only boring people who say they're boring anyway?

But I started to wonder, what actually happens to me when I'm bored?

What if there was nothing more boring than that?

And what happens if we remove this human emotion altogether?

I started talking to neuroscientists and cognitive psychologists, and I heard some very interesting stories.

When you're bored, a network in your brain that's called "default mode" switches on.

While your body is on autopilot while you're folding laundry or walking to work, your brain is actually very busy at this time.

Dr. Sandy Mann, who studies boredom, says,

(Audio) Dr. Mann: When you let your mind wander wildly and let your mind wander, you start thinking a little bit beyond your conscious mind.

this is really cool

Manouche: That's amazing!

This is my brain in an fMRI, and in its default mode, we can connect disparate ideas to solve particularly thorny problems, and we also do what's called "autobiographical planning."

It's about looking back at your life, recording the moments that matter, creating your own story, then setting goals and figuring out the steps you need to take to reach them.

But now we're also sitting on our couches updating Google docs and answering emails.

It's about "getting rid of everything you do." But neuroscientist Daniel Levitin says this is what we actually do.

(Audio) Dr. Levitin: Every time you shift your attention to something else, your brain has to use a neurochemical switch, and that shift of attention uses up your brain's nutrients.

When you're trying to multitask, when you're doing four or five things at once, you're not actually doing four or five things at the same time, because your brain doesn't work that way.

You're moving from one thing to the next in such a short time that your neural resources are being depleted along the way.

(Audio) Manouche: If you're just transitioning, you're going to be using up a lot of glucose.

(Audio) Dr. Levitin: Great answer, and glucose is limited.

Manouche: Ten years ago, at work, you would shift your attention to something else every three minutes.

Now it's every 45 seconds, and I've been doing it all day.

On average, people check email 74 times a day and switch between computer tasks 566 times a day.

I learned about all of this through a conversation with Dr. Gloria Mark, a professor of informatics.

(Audio) Dr. Mark: We found that people tend to shift their attention away more quickly when they're under stress.

What's more, it's a strange finding that the less sleep you get, the more likely you are to check Facebook.

We are caught in this vicious cycle of lifestyle.

Manouche: But is this cycle irreversible?

What would happen if we broke this vicious cycle?

Radio listeners may be able to help you find answers.

What would happen if we regained the gap time during the day?

Will it unleash our creativity at once?

We called the project, "Bored makes your brain spark."

We expected a few hundred people to show up, but thousands of people started signing up.

And they told me that the reason they signed up was because they were worried that their relationship with their smartphones had become something of a codependent state.

(Audio) Man: The relationship between a baby and a teddy bear, or a baby and a pacifier, or a relationship where a baby wants to go back into its mother's arms after being held by a stranger -- (Laughter) and me and my phone.

(Audio) Woman: I think my phone is like a power tool.

(Audio) Woman 2: If you're not careful, you'll suddenly realize that you've wasted an hour without even thinking about it.

Manouche: OK You need data to really measure improvement, right?

That's the way it is nowadays

So we partnered with an app that measures how much time you spend on your phone each day.

You might think it's ironic to ask people to download a new app to their phone and use it to reduce the amount of time they spend on their phone.

(Laughter) Before Challenge Week, on average, we touched our phones two hours a day, and we picked them up 60 times, which meant we glanced at them. Got any new emails? And

Bard College student Tina made a discovery about herself.

(Audio) Tina: Right now, I spend 150 to 200 minutes a day on my phone, and I check 70 to 100 times a day.

It really hurts me, because if I had this much time, I could have used it for something more productive, creative, or for myself, and when I'm on my phone, I'm not doing anything important.

Manouche: Like Tina, participants began to observe their own behavior.

Ready for Challenge Week

And that Monday morning, I would wake up and read the instructions in my inbox, and I would try what was written there.

Day 1: "Put your phone in your pocket"

take your phone off your hand

I'll see if I can stop checking reflexively all day, just for one day.

And the only people who think this is easy are those who haven't tried it.

Viewer Amanda Itsuko said,

(Audio) Amanda: It's so tingling.

It's kind of weird, because I just realized that I check it every once in a while, when I'm walking to another room, when I'm in an elevator, and I'm really embarrassed to say it -- even in my car.

Manouche: Ahhh!

Yeah, but as Amanda learned, this itching isn't actually her fault.

Technology is designed to elicit exactly this behavior.

(laughs) Right?

Former Google designer Tristan Harris said,

(Audio) Tristan: Facebook, Netflix, Snapchat, they all have thousands of techies whose job it is to get more of your attention.

They're great at getting people's attention, and they're desperate not to miss it.

As the CEO of Netflix recently said, "Our biggest competitors are Facebook, YouTube and sleep."

So there's a mountain of space to grab your attention, and it's scrabbling for it.

Manouche: I'm sure you're familiar with watching the moving episode of the drama "Transparent", and then the next episode started playing, and things like, okay, let's watch this one too.

Or when LinkedIn's progress bar tells you that you're getting closer to the perfect profile, you add a little more personal information.

According to one user experience designer, only drug dealers and engineers refer to their customers as "users."

(Laughter) (Applause) And as you know, users are worth a lot of money.

Antonio Garcia Martinez, former Facebook product manager and author, says,

(Audio) Antonio: As they say, if the product is free, you are the product, and your attention is the product.

But how much is it worth?

Not just on apps like Facebook, but every time you open a page, there are billions of auctions happening instantly every day.

Manush: By the way, the average person spends two years of their life on Facebook.

Back to Challenge Week

I soon found my creativity kicking in.

According to The New Yorker's Lisa Alpert

(Audio) Lisa: I think it was boring.

And then I suddenly saw the stairs leading up to the top of the station, and I thought, I've just come down that staircase, and I think I might as well go up again.

So I did it, and I had a little more time, so I did it over and over, and I ended up doing it 10 times.

I was able to do a perfect aerobic exercise

I felt exhausted, like I was on a subway train, but I had never experienced anything like that before.

why did you do that

(Laughter) Manouche: So we've also learned that creativity manifests itself differently from person to person.

(Laughter) But we all agreed that the third day's task was the hardest.

It's called "delete that app"

I'm going to delete that app, you know? I'm going to delete that app that keeps you hooked, even if it's just for the day

I deleted the game "Two Dots" I almost cried

(Laughter) Well, if you've ever done it, you know.

But my tragedy had a good companion.

(Audio) Man 2: This is Liam from Los Angeles. I deleted Twitter, Facebook, Instagram, Tumblr, Snapchat and Vine from my phone.

At first, I became embarrassingly emotional.

I felt strangely lonely when I saw no new notifications on my lock screen.

But what I really like is that instead of letting your phone decide when to think about and access your personal network, you decide for yourself.

so thank you

(Audio) Woman 3: I'm sad that you deleted Twitter. Maybe I've been on Twitter for the last year and maybe I've become addicted.

For a short time, I had a very painful emotional withdrawal, but it's like a headache when the caffeine wears off, and I feel great now.

I had a wonderful dinner with my family. I would like to continue to use powerful tools like smartphones by setting rules.

(Audio) Woman 4: Until I realize I'm wasting my time on my phone, I don't really feel guilty.

Maybe I'll have to try and remember like this, every morning.

Manush: Good progress

I can't wait to see what the numbers look like at the end of the week.

But when we looked at the data, we found that, on average, we were only cutting six minutes. We went from 120 minutes a day on our phones to 114 minutes.

No, no...

When I went back to the scientists, I was laughed at and told that it was ridiculously ambitious to change human behavior in such a short period of time.

Because what's more important than saving time is people's stories.

they were empowered

Their phones stopped doing tasks and went back to being just tools.

In fact, what I found most interesting was the reaction of young people.

Some people said they didn't realize some of the emotions they had during Challenge Week.

this may affect the future

Researchers at the University of Southern California found that in their study, teens who accessed social media, conversing with friends and doing homework, were less able after two years to think creatively and imaginatively about their own future and solving social problems, such as violence in their neighborhoods.

We really need this next generation to focus on big issues like climate change, economic imbalances, massive cultural differences.

No wonder CEOs in an IBM survey ranked creativity as the number one leadership ability.

Okay, but here's the good news. Ultimately, that week, 20,000 people worked on the "Bored to Spark Your Brain."

90% of people reduced their usage time

70% of people spent more time thinking

I think I slept better than ever before.

Participants felt happier

One of my favorite quotes came from a man who said that his mind had just come out of hibernation.

Personal data and neuroscience have allowed us to stay offline a little longer, and a little boredom has given us clarity and, for some, helped us set goals.

Being connected all the time may not be so nice in a few years.

But in the meantime, we need to incorporate digital literacy into teaching people, especially children, how to use technology to improve their lives and gain control over themselves.

So the next time you check your phone, remember that if you don't decide how to use technology, the platform will decide for you.

Ask yourself, "What am I really going to do now?"

If you check your email, that's fine, let's do it

But if that's what gets you out of the harder, more thoughtful work, take a break, stare out the window, and realize that doing nothing is actually the most productive and creative thing you can do.

It may seem strange and unsettling at first, but when you're bored, your brain really does come up with great ideas.

thank you

(applause)

How many companies did you deal with in one day today?

You get up in the morning, you shower, you wash your hair, you blow dry it, you eat breakfast – you eat cereal, some fruit, some yogurt, you drink coffee – or you drink tea.

You would have taken public transportation to get here, or you would have taken your own car.

Involved with the company you work for or manage

Engagement with the client Engagement with the customer, it's like that

Today alone, I can assure you that you are involved with at least seven companies.

I will tell you about the amazing stats

1 in 7 large corporations commit fraud each year

This is an academic study of American companies, but I don't think it would be very different in Europe.

This study uses statistical methods to derive the number of cheating cases with and without exposure.

Cheating is not a petty scam

Fraud costs the company's shareholders and costs society $380 billion each year.

I think I can give you an example

Auto industry secrets are no longer secrets

Fraud in the financial services industry is no longer a bug, it's part of the mechanics.

That's not my personal opinion, it's what the president of the American Academy of Monetary Science said in his inaugural address.

Given an economy like Switzerland, which relies heavily on the credit of the financial industry, this is a huge problem.

Meanwhile, 6 out of 7 companies remain healthy, resisting the temptation to commit fraud.

There are people like Michael Woodford, the whistleblower at Olympus.

Such whistleblowers expose their corporate truths at the risk of sacrificing their careers and friendships.

There are journalists like Anna Politkovskaya who risk their lives to cover human rights violations.

She was murdered. Every year, about 100 journalists are killed for their belief in revealing the truth.

In my talk today, I'd like to share with you what I've learned from 10 years of research on this subject.

I'm a researcher, and I work with a wide variety of people -- economists, financial economists, ethicists, neuroscientists, lawyers -- to understand what drives people, how to solve the problem of corporate misconduct, and thereby contribute to making the world a better place.

I would like to start by sharing two different visions of what people do.

The first is Adam Smith, the founder of modern economics.

His basic idea was that if everyone acted for their own self-interest, it would ultimately benefit everyone.

Self-interest is not just a frivolous concept

have a long-term impact

let's think about it

Take this dog for example

maybe we are ourselves

So let's say you've been tempted to: (sorry vegetarians.) (Laughter) Dogs like bratwursts.

(Laughter) And let self-interest take over and jump straight in

My friend Adam jumps up and takes the sausage, but he messes up the beautiful dishes.

But I didn't mean to

He had no intention of ignoring this unintended outcome.

He would have thought that it might turn out badly, for example, that the owner might get angry, and the dog might change his mind.

This may be what we look like. We compare the gains and losses of our actions.

where does that idea come from?

In many companies you work for, especially if you're a large company, there's bound to be a code of conduct.

If you act according to the code of conduct, your chances of getting a bonus will increase.

On the other hand, if you ignore it, you don't get the bonus or it's reduced.

In other words, it's financially motivated to make people more loyal and in line with corporate norms.

By analogy, reputation is a very strong economic driver.

To gain a good reputation, for example, try to be honest and encourage people to trust you more in the future.

That's right?

Adam Smith spoke of a baker who makes good bread not out of kindness to the consumer, but out of a desire to sell more bread in the future.

In a study I did at the University of Zurich, it became clear that, for example, tax evasion, tax fraud, and so on, when Swiss banks are featured in the media, they lose their reputation.

And they lose out on future new deposits, and their profits shrink.

This is a very powerful example of the power of reputation

profit and loss

I'll tell you another way of looking at the world

Immanuel Kant was the superstar of 18th-century German philosophy.

The idea he developed was that some actions are just right and some actions are just wrong, regardless of the consequences of those actions.

A good example is that lying is bad.

Now let's bring in my friend Immanuel.

He knows that sausages are delicious, but he's a good dog, so he won't eat them.

He knows it would be wrong to jump onto a shelf and risk destroying beautiful dishes.

Incentives, codes of conduct, bonus schemes, and so on, don't make much sense when you think that people are also motivated to act in this way.

People are probably motivated by different values.

So what really motivates us?

These two gentlemen have perfect haircuts, but they give us a very different view of the world.

how should we act?

I'm an economist, and I'm running an experiment to solve this problem.

Get rid of the facts that cause confusion in reality

Reality is so rich and so much going on that it's almost impossible to know exactly what drives people to act.

I'm going to do a little experiment here.

Imagine a situation like this

You are alone in a room, not in this kind of place.

In front of me is a five-franc coin like the one I have now.

Your task is to toss a coin four times and enter into a nearby computer how many tails you get.

This is the situation

Here's where it gets tricky

Five francs will be paid for each number of reverses declared.

10 francs will be paid if you declare that you have seen the reverse side twice.

If you declare that the number of times the reverse side has come out is 0, you will receive 0 francs.

If you declare that you have four reverse sides, you will be paid 20 francs.

It's anonymous, so no one can see what you're doing and you can receive payments anonymously.

I will ask you two questions

(Laughter) Can you imagine the question?

The first question is how would you behave?

The second question is, look to your right and to your left -- (Laughter) How do you think the people sitting next to you will behave?

I actually tried this experiment

When the Manifesta art exhibition recently took place in Zurich, it wasn't aimed at students in university labs, but at ordinary citizens like you.

First, a review of statistics

If you toss a coin that has the same probability of showing up and down 4 times, the probability of getting 4 backs is 6.25%.

Intuitively, the odds of getting four tails are much lower than the odds of getting two.

It is represented numerically like this

now what happened

People actually did this experiment

About 30 to 35 percent of people say, "Well, I got four tails."

It's an extremely improbable number.

(Laughter) Perhaps even more surprising to economists, about 65 percent of people didn't report four tails, even though they could have made more cash if they reported four tails in an unsupervised environment.

If you declare 0, leave 20 francs on your desk and walk away.

It was an anonymous survey, so I don't know if people were really being honest or reporting slightly different numbers.

we just observed the statistical distribution

But all I can say is— oops, one more coin.

the back is out

(laughs) You can't look it up, can you?

(Laughter) But what I can tell you is that not everyone did exactly what Adam Smith predicted.

what does this mean?

People seem to be motivated by their own values, and our research focuses on this.

I'm researching a concept called "conservation value."

“Protection value” is more than just a value

"Protection value" is the value that we want to protect even if we have to pay a price.

I'm willing to pay the price to overcome the temptation to be swept away.

As a result, you feel good when you make money in a way that aligns with your values.

I'll illustrate this with the example of a lovable dog.

If we can get sausages without distorting our values, sausages will taste better.

our research showed that

On the other hand, similarly, if you can get the sausage, but if you distort your values ​​because of it, the value of the sausage goes down.

Quantitatively very strong

You can also measure that "protection value," for example, by means of a survey.

A simple nine-item question helped predict in this experiment.

If you think about the mean, there's a distribution around it -- people are all different, we're all different.

People with a certain set of "protective values" are one standard deviation above the mean, and they feel that the money they've been lied to is 25 percent less valuable.

The results show that every dollar they lied about was worth 75 cents to them, even if there were no incentives to behave honestly.

it's their instinctive motivation

By the way, I'm not a moral expert.

I'm not saying I have all the virtuous values, am I?

But I'm interested in how people behave, and I'm interested in whether the richness of humanity can actually be harnessed to improve organizations.

There are two very different visions

One way is by appealing to gains and losses to get people to act on them.

The other way is that you choose people who have the same values ​​and, of course, desirable traits and skills that will be useful in your organization.

We don't yet know where such "protection values" come from.

nurtured or spontaneous

What I can tell you is that the distribution is very similar for both males and females.

It's something that people who studied economics are very similar to people who studied psychology.

Adults are very similar across different age groups.

We also don't know how it will develop throughout life.

These are future research topics

The idea I want to share with you is that appealing to incentives is the right thing to do.

As an economist, I'm a firm believer that incentives work.

But rather than building a system to bring people together and incentivize them, think about picking the right people.

Because if you get the right people with the right values, you'll end up forestalling a lot of your organization's problems and losses.

In other words, if you put people first, you'll get better results.

thank you

(applause)

it was 1878

Sir Francis Galton made a remarkable announcement

Lecture at the Royal Anthropological Society

Known for his pioneering work on human intelligence, Galton was an outstanding polymath.

He was an adventurer, an anthropologist, a sociologist, a psychologist, a statistician.

was also a eugenicist

In that presentation, he presented a new technique for generating a composite image from several photographs.

I thought that this method might be able to characterize different types of people.

Galton thought he could find criminal faces by merging photos of thugs.

But to my surprise, the composite image showed a beautiful face.

Galton's astonishing discovery raises profound questions: What is beauty?

Why do certain line and color compositions inspire us?

For much of human history, this problem has been tackled using logic and speculation.

But for the last couple of decades, scientists have used the ideas of evolutionary psychology and the methods of neuroscience to address the question of beauty.

We're beginning to understand why we're beautiful and how we feel beauty, and we're finally starting to understand what it means for the human face and body.

And in the process, I discovered something amazing.

Finding beauty in others is, of course, an individual decision, but shaped by factors that contribute to the survival of the group.

Numerous experiments have shown that some basic factors can make a face attractive.

averaging, symmetry, hormonal effects, etc.

Let's look at them one by one

Galton's finding that the average face is more attractive than the individual's face of that average specimen has been replicated over and over again as a matter of course.

The findings of this study match the intuition of many people.

The average face represents the core tendencies of the group.

People with mixed traits represent different populations, perhaps suggesting greater genetic diversity and adaptability to the environment.

Many people find mixed race individuals attractive and not consanguineous marriage individuals.

The second beauty contributor is symmetry.

People find symmetrical faces more attractive than asymmetrical faces.

developmental abnormalities often involve asymmetry

In plants, animals and humans, asymmetries are often caused by parasitic infections.

Symmetry has also been found to be an indicator of health.

In 1930, a man named Maximilian Factorovich realized the importance of symmetry in beauty when designing a facial scale.

With this instrument, he was able to measure even the slightest symmetry disturbances, and his company sold a product designed to correct it -- the Max Factor, which flamboyantly inherited his own name -- and, as you know, is one of the most famous cosmetic brands in the world.

The third factor of facial attractiveness is the effect of hormones.

I apologize here for restricting my comments to normal heterosexuals.

Estrogen and testosterone play an important role in the traits we find attractive.

Estrogen creates the traits that indicate fertility

Men are generally attracted to women who are both young and mature

Similarly, faces that are too childish are perceived as girls with low fertility potential, which is why men find women with large eyes more attractive, plump lips and narrow chins as indicators of youth, and large cheekbones as indicators of maturity.

Testosterone creates characteristics that are generally considered masculine.

This includes dark eyebrows, thin cheeks and a sturdy, angular chin.

But here's the funny irony

In many animal species, testosterone weakens the immune system.

It's not quite right to say that the traits that testosterone provides are indicators of health.

The logic is reversed here

Instead of indicators of fitness, scientists come up with handicap theory.

The best example of handicap theory is the peacock's tail.

Its beautiful but nasty tail feathers are powerless to evade predators and cumbersome to approach females.

So why did such an outlandish appendage evolve?

Even Charles Darwin wrote to Asa Gray in 1860 that his interpretation of the peacock's tail made him sick.

He couldn't explain it with the theory of natural selection, and after that conflict he proposed the theory of sexual selection.

This means that the act of showing a peacock's tail feathers is a sexual lure, and this lure encourages the peacock to mate and produce offspring.

This new theory of tail feather display is that male peacocks make health appeals to females.

Only the most adaptable organisms are able to divert resources to sustain their extravagant appendages.

Only particularly adaptable males can pay the price of testosterone for their immune system.

By the same logic, wouldn't only very wealthy men be willing to pay $10,000 or more for a watch to demonstrate their financial prowess?

Many people, when hearing these evolutionary claims, assume that we casually and subconsciously seek out a healthy mate.

But I don't think this idea is correct.

Teenagers and young people are not perceived to make decisions based on health concerns.

You don't have to, I'll explain why

Suppose we have a group of people who show three kinds of tastes: green, orange, and red.

From their point of view, this preference has nothing to do with health; they just like their favorite colors.

But what if the preference had something to do with the likelihood of producing offspring, say three to two to one? So if in the first generation, three greens and two oranges are one red, then in subsequent generations the percentage of greens increases, and by the 10th generation, 98 percent of this population prefers green.

And then a scientist comes along and does a sampling of this population and finds that the preference for green is universal.

This conceptual example shows that a preference for a particular physical trait is contingent on an individual, but that trait is inherited and, over time, becomes a universal preference for the population if it is reproductive.

What happens in your brain when you see someone beautiful?

Attractive faces activate parts of the visual cortex in the back of the brain, an area specialized in processing face information called the fusiform gyrus, and next to it, an area specialized in processing object information called the lateral occipital complex.

Moreover, an attractive face also activates the reward and pleasure centers, which include regions in the front or deep part of the brain with very complex names: the ventral striatum, the orbitofrontal cortex, the ventral prefrontal cortex, and so on.

Our visual brain, which is optimized for facial information processing, interacts with the pleasure center to try to remember experiences related to beauty.

It's amazing how we all relate to beauty, and even if we don't know it, beauty relates to us.

Even if we're not conscious of beauty, our brains respond to attractive faces.

I did an experiment where subjects were shown a series of faces, but given only one condition: subjects were asked to decide if a pair of faces were the same person.

Under these conditions, attractive faces strongly induced activation of neural activity in the visual cortex, even when intended for personal identification rather than beauty discrimination.

With similar results, another group found an automatic response to beauty in the pleasure center.

Taken together, these studies suggest that our brains associate sight with pleasure and automatically respond to beauty.

These "beauty detectors," apparently, always ping when we see someone beautiful, no matter what else we're thinking about at the time.

There is also an imprint in the brain that "beauty is a good thing."

In the orbitofrontal cortex, there's overlapping neural activity in response to beauty and goodness, and this response occurs even when we're not consciously thinking about beauty and goodness.

Our brains seem to automatically associate beauty with goodness.

And this reflex association may be a biological factor in the social impact of beauty.

Attractive people have an advantage in every aspect of life.

You'll be seen as more intelligent, you'll be more trustworthy, you'll earn more, and you'll be punished less, even if those judgments aren't justified.

These observations also expose the ugly side of beauty.

A recent finding in my lab is that people with minor facial abnormalities or deformities are seen as less nice, less kind, less intelligent, less capable, less hardworking.

Unfortunately, we are taught that ugliness is bad.

These imprints are reinforced by the unfair treatment of images in popular media that easily use facial ugliness to represent malicious people.

If we're to overcome these kinds of unconscious biases, we need to move toward a society that understands these biases and judges people by what they do, not what they look like.

One last thought

beauty changes over time

So-called universal beauty elements were selected two million years after the Pleistocene.

Long ago, creatures were mean and cruel.

It's not right to apply selection criteria based on fertility to modern times.

For example, deaths from parasites are not among the top causes of death, at least not in technologically developed regions.

From antibiotics to surgery, from birth control to in vitro fertilization, the selection criteria for reproductive success are being relaxed.

And in such relaxed conditions, the mix of tastes and habits is free to change and diversify.

Despite our profound impact on the environment, modern medicine and technological innovation are having a profound impact on the nature of what it means to look beautiful.

As we change the world, so does universal beauty.

thank you

(applause)

I'm afraid

I'm terrified on this stage right now.

I don't think I've ever met many people who would openly admit to the fear they feel.

Maybe it's because you know deep down inside, fear spreads easily.

fear is like a disease

Fear spreads like wildfire

But what do you think will happen if you take action in the face of fear?

It's called courage

Like fear, courage is contagious.

I'm from East St. Louis, Illinois

It's a small town just across the Mississippi River from St. Louis, Missouri.

I've lived near St. Louis since I was born.

An ordinary boy named Michael Brown Jr. was shot dead by a police officer in 2014 in Ferguson, a suburb north of St. Louis, Missouri.

But his death was a little different.

When Mike was killed, those in power tried to use fear as a weapon.

For those in mourning communities, the police's response was to use force to instill fear: fear of armed police, imprisonment, and fines.

Even the media twisted the facts to make us fear each other.

So far, these things have had an effect.

But as I said earlier, this time was different.

The death of Michael Brown and the ensuing response to local residents sparked protests in the Ferguson and St. Louis neighborhoods.

I went to protest on the fourth or fifth day, not because I had the courage, but because I felt guilty.

As you can see I'm black

I don't know if you've noticed

(Laughter) In St. Louis, right next to Ferguson, I couldn't sit still, I couldn't help but go.

So I got up and went to see how things were going

I went to the site and found something amazing

there was a lot of anger there

But what I felt more was love

as we all love ourselves

I loved my hometown

It was very beautiful, but when the police showed up,

I could see a new emotion being injected into people's conversations: fear.

And let's be honest, when I saw the armored vehicles, all the equipment, all the guns, and the police, I was terrified myself.

I looked around and saw many people in the same situation.

But some people had feelings other than fear.

it's courage

Courageous people yelled and yelled and were undaunted by the police.

I was past that stage

I also felt something change inside me, and I started screaming and yelling, and I suddenly realized that everyone around me was doing the same.

I will never forget the feeling of exhilaration at that time.

i thought i could do more

I went home and thought, "I'm an artist and I'm going to make something."

I started making things for protests, things that could be weapons in the war of the souls, things that could communicate people's feelings, things that would motivate them to move forward.

As a project, I took pictures of the hands of protesters and pasted them all over the walls of boarded up buildings and local shops.

By doing so, I wanted to raise awareness and morale.

I think it worked, even if it was only for a short time.

And then I wanted to spread the word about the people who showed courage in that moment.

And then I turned it into a documentary, together with my friend and filmmaker Sabha Folayan, called "Whose Streets?"

You could say that I acted as a conduit to spread the courage that everyone gave me.

I think that's one of our roles as artists.

We artists should bring courage to people through our work.

And we also act as a wall, a wall that separates ordinary people from those who use their power to spread fear and hatred, especially at times like this.

I have a question for you

As people of influence, as thought leaders, what can you do to use your talents to help others overcome the fears that haunt them on a daily basis?

I am terrified every day

There is no day without fear

But I realized that fear didn't stop me, it protected me, and when I knew how to use it, I found my power.

thank you

(applause)

Hello everyone

First, let's go back to 2007.

The album I'd been working on for six months was getting three plays a day on Myspace at the time.

So I decided to make a YouTube video too.

One day, my band's video was featured on the YouTube front page, and it was a big deal, and I gained a lot of new fans.

And then again, there were a lot of people who didn't like the music or what, but -- (Laughter) that's okay, a lot of people started coming to gigs, we started touring, we put out records.

When I checked my iTunes sales for the first month, I was surprised to see $22,000.

For the next four years, I kept uploading video after video to the Internet, and it was getting better and better, and brand deals, commercials, iTunes sales, and enough money to buy a house.

I built a recording studio

But there was one big problem, and it was really weird for creative people to make money in 2013.

Above all, the business model was constantly changing.

Annual revenue from iTunes downloads of $58,000 fell to just under $6,000 from streaming.

Streaming was worse than downloading

New creators were popping up all over the internet, and the competition for brand deals worth tens of thousands of dollars was fierce, and that was what kept the band going.

And on top of that, our videos themselves -- the creative stuff that our fans loved, the value that they brought to the world -- those videos made very little money.

This is a shot of my YouTube dashboard, and it's been viewed a million times in 28 days, and the ad revenue is less than $166.

In 2013, there was no mechanism at all to post works online and exchange them for money.

Whether you're a newspaper publisher, an institution, or an individual creator, it doesn't matter.

Even if you make a webcomic and have 20,000 readers a month, the advertising revenue is only about $200.

20,000 people is enough to fill an NBA arena.

In what world would you say that's not enough?

I do not understand

What kind of system have we created that we can't live with?

I have an opinion on this

The "Strange 100 Years" Theory

(Laughter) (Applause) About 100 years ago, we discovered a way to record sound in waxed cylinders.

Birth of the gramophone

Around the same time, we discovered how to record light on photographic paper and celluloid, which was the birth of film and television.

It was amazing because it was the first time that such a work could be recorded on a physical object.

Until then, art was all fleeting, and if you missed the symphony, that was it.

But now, being able to record an orchestral performance and listen to it later, that's been great.

In fact, it's incredible, and over the next 100 years, from 1900 to 2000, humanity spent billions of dollars building an infrastructure that basically allowed artists to do two things.

One is to document the work on an object, and the other is to deliver that object to people around the world who want it.

Various industry efforts have been directed to these two issues.

Trucking companies, retail stores, marketing companies, CD case manufacturers all came together to solve these two problems.

We all know what happened after that

Ten years ago, the Internet matured, and Spotify, Facebook, YouTube, iTunes, Google search came along, and 100 years of infrastructure and supply chains and delivery systems and monetization methods were completely bypassed in just 10 years.

After 100 years of hard work, it's no wonder the system is completely broken for creative people today.

No wonder the monetization part isn't working in this new context.

But the reason I'm so excited to be a creator, to be alive and creative, is because I've realized that it's only been 10 years since we started trying to figure out new mechanisms that will be the infrastructure for the next 100 years for us creators.

in just ten years

There's been a lot of trial and error, some really good ideas, and a lot of experimentation to figure out what works and what doesn't.

For example, Twitch broadcasts Anyone heard of Twitch?

Twitch streamers earn between $3,000 and $5,000 a month streaming gameplay.

Well-known players make over $100,000 a year.

There is a site and app called YouNow

Musicians and vloggers have a system where fans pay with digital goods.

I am also working on this issue

Four years ago, I started a company called Patreon with a friend.

Now we have 80 people working on this problem.

It's basically a membership platform that's trying to make it easier for creators to earn money by asking fans to pay for their lives each month.

It's like being paid for being a creative person.

Here is an example of its creator

It's called "Kinda Funny"

220,000 subscribers on YouTube

The videos they upload have been viewed 15,000 to 100,000 times.

I want you to think for a moment here.

When you hear "15,000 views," or when you see this kind of content, you automatically think it's not as good as the morning show you hear on the radio or the talk show you see on NBC or whatever.

It got off to a good start so quickly that they decided to add the show, created a second Patreon page, and made an extra $21,000 a month.

And they've essentially grown into a media company, fully funded by membership fees.

this is another example

Sports writer Derek Bodner wrote for Philadelphia Magazine, but a few months ago the sports section disappeared.

Now he writes for his own website, and he's still a sports reporter, but he's doing it on his own.

1,700 patrons earn $4,800 a month in dues

This is "Crash Course", providing free educational content to the world.

You can watch this show on the PBS Digital Network, and it's making $29,000 a month.

It's funded by 1,400 patrons of two yachts around the world telling stories about their journeys.

This is a podcast called "Chapo Trap House," and after I took this screenshot, my income increased by $2,000, and now I'm making $56,000 a month from the podcast.

Patreon isn't the only one working on this issue

Even Google has taken action

We started about two years ago with Fan Funding, and recently we've introduced Super Chat again, where creators can earn money from live streaming.

Newspapers are also experimenting with membership services.

The New York Times has a membership program, and the Guardian has a membership program with 200,000 paying subscribers.

Like this simmering soup, ideas, experiments, and new developments are springing up right now, moving in a direction that will get paid for creators.

and it's working

It's not perfect yet, but it's working.

There are 50,000 creators who earn monthly income on Patreon. They make money every month by uploading their work and being creative.

We're building the infrastructure for the next 100 years, and what's different about this one is that it's a direct connection between the people who make the work and the people who love it.

Seven or eight years ago, I went to a cocktail party.

when my band had its first hit and was starting to do well

I was making $400,000 a year from iTunes sales, branding, etc.

Someone asked me, "What are you doing?"

I answered, "I'm a musician."

In an instant, he turned serious, clasped his hand, put his hand on my shoulder, and said in a very earnest and warm voice, "I wish you all the best."

(Laughter) I don't—

There are many moments that are engraved in my memory.

I feel embarrassed when I think about it

Feeling unappreciated as a creative person is very embarrassing.

But the creator race is leaving those cocktail parties behind.

I'm trying to get out of that culture.

The mechanisms for paying creators are getting so good that in less than 10 years, young people graduating from high school and college will see being a creator as a normal option: become a doctor, become a lawyer, become a podcaster, become a webcomic author.

you will be able to do it normally

we are finding that way

Creators will become a viable, sustainable and respected profession.

Through this century's journey, creators coming out of the strange end of a century will have wonderful new machines.

You get paid properly, you get valued properly

thank you everyone

(Applause) I think it went really well.

I want artists who see this to know that they are not giving up and that they are just around the corner.

We haven't gotten there yet, but in two years there will be a lot of systems and tools that will allow creators to make a living online.

soon

Let me add one more thing to the current complexity of the situation.

As we work to solve climate change, we'll be building cities for three billion people in the future.

Urban environment doubled

If we don't do it right, even all the climate change efforts around the world will be at risk of saving humanity, because many things depend on how we shape our cities, for example, not just their environmental impact, but also our social well-being, our economic viability, our sense of belonging and belonging to our communities.

Fundamentally, how we shape our cities reflects the kind of humanity we carry.

So finding the right answer is an urgent task today.

And to some extent, it will also help solve the global warming problem, because after all, the way we behave seems to make the problem worse.

It's not about vague problems, it's not just about ExxonMobil and oil companies.

it's a matter of how we live

is the way we live

Let me start by saying [low-density urban sprawl]

Today's story is about sprawl.

But I'm not talking about low-density urban development on the fringes of metropolitan areas, as you might imagine.

We believe that sprawl will occur under any building density.

Its main characteristic is that people become isolated

People are separated by their respective economic strata, and land use is also separated.

pulls the city away from nature

Such a city doesn't create the opportunities for interaction and stimulation, the opportunities that enhance the value of the city and the prosperity of its society --

So we need to think about ways to prevent sprawl, especially when we're conceiving large architectural projects.

Let's do one brain exercise

Developed a California model aimed at reducing carbon emissions

We've looked at all the scenarios of state development, and this is one of those oversimplified examples.

Mixing up the various prototypes of development, we assumed that model would continue until 2050, adding 10 million new people to California's population.

One prototype was a sprawl

Familiar shopping malls and subdivisions Vast office districts

Another prototype centered around a "compact" development, not everyone moving to the city, suburbs with traditional trams, walkable neighborhoods, low-rise, integrated architecture, mixed-use developments.

I got amazing results

Not only was it radically different from how we've built our cities, but it also represented the voices of different groups, each of which promoted a particular interest, while each interest group has spoken out in many different ways.

They didn't see a way to coexist with other people, which I call the "common advantage" of the city.

Consumption of land. Environmentalists are very concerned about this, farmers are no different, and of course all sorts of people are raising concerns, including neighborhood groups who want open spaces in their neighborhoods.

Sprawl in California doubles [area difference over Delaware + Rhode Island] urbanized area [area difference over Delaware + Rhode Island]

We've seen tremendous reductions in greenhouse gas emissions. Cars are the main source of carbon emissions in California.

Vehicle mileage (VMT) — that's what I just said [VMT: 16,000 km less per home]

Reducing the average mileage of a household from an average of about 42,000 kilometers a year to an average of 16,000 kilometers a year has a huge impact not only on air quality and carbon emissions, but also on household budgets.

It's expensive to drive such long distances, and as you know, the middle class is barely living.

Medicine Instead of talking about how to fix it after it's gone bad, let's purify the air.

Should we stop air pollution? [Respiratory health care costs: savings of $1.6 billion annually]

Should I switch to walking or cycling? [Respiratory health care costs: savings of $1.6 billion annually]

That's the kind of city that we want to create.

Household spending [$10,000 savings per house per year in 2050] 2008 was a historic year [$10,000 savings per home per year in 2050] On top of financial turmoil [$10,000 savings per home per year in 2050]

They were trying to sell too many badly designed homes: large lots, single-family homes, remote locations, too expensive for the average middle-class family, and quite frankly, not for their lifestyle anymore.

But you're selling your mortgage at a bargain to clear your inventory.

I think most of the financial crisis was like that.

A $10,000 reduction in household costs -- remember that the median in California is $50,000 -- and that's a big factor.

And that's just the cost of gasoline, electricity, water and gas.

Advocates of affordable housing, who tend to shut themselves off in their usual worlds, haven't teamed up with environmentalists or politicians, and everyone has been fighting everyone, but they're finally finding the same goals, and I think that's going to really make a difference.

As a result of these efforts, LA has steered toward becoming a more transit-oriented city.

In fact, since 2008, we've issued $400 billion in public transit bonds and voted not to invest in new highway construction.

What a transformation, Los Angeles will change from a car-based city to a pedestrian and transit city.

(Applause) How?

Add transportation where the least attractive land and commercial spaces are, add mixed-use developments, meet new housing needs, and make existing neighborhoods more complex and interesting to walk around.

And then there's another form of sprawl [highly populated sprawl] high density sprawl in China -- it's self-contradictory, but it's the same problem of huge plots of everything being isolated.

Twelve percent of China's GDP is spent on the resulting health hazards.

Chinese cities are historically robust

like any other city

The elements that made up a community were small local shops, community services, walking, and socializing with neighbors.

It sounds like an ideal, but it's not.

is what people actually want

There are about 5,000 houses in modern gigantic plots, and they're all strangers, so they're surrounded by fences.

Of course, there are no sidewalks, and there are no shops on the street — it's a very barren environment.

In one of these gigantic lots, we found this example, where residents were illegally renovating their garages to create shops in an attempt to create a local service economy.

It is people's desire to realize a proper local environment.

Add to that the power of city planners and politicians.

Now let's talk about the technical plan.

Chongqing is a city of 30 million people.

It's about the size of California

This is a small development section of part of it

A few cities in China asked me to try a different kind of urban design than sprawl.

4.5 million people live here

What you can see in this image is that each of these circles represents a walking distance from a train station, and there's been a massive investment in subways and highway bus systems, and a layout that allows everyone to work within walking distance.

zoom in on the red part

So we realized that our philosophy was that we wanted green spaces and that it was important to preserve the vital functions of natural ecosystems.

And the rest of the roads are roads that cars can't drive on.

We stopped bulldozing the land, and instead of placing buildings all the way to the edge of the river, we planted green spaces along the banks of the river, until we started experimenting with this example.

The smaller blocks that make up the urban structure will have about 500 units per block.

people know each other

There are shops around the street, and locals gather there.

There are many roads, so there will be more small roads

It's a very simple and straightforward urban design.

now this is what i love so much

This is the reasoning

If 1/3 of the population has a car, why make the road 100% carriageway?

What if 70 percent of those roads were used for non-motorway purposes, making transportation more efficient, more accessible for walking and bicycling?

How about -- (Applause) Add the concept of geographic fairness to our traffic circulation system?

Frankly, cities would work better.

No matter what you do, no matter how many ring roads you build in Beijing, it's impossible to overcome complete traffic jams.

This is a car-free road

Transportation runs through the center

It would be nice if it was a self-driving car, more on that later.

Chinese government officials have adopted seven principles and are trying to apply them in practice.

I think these seven principles are simple and apply everywhere in the world.

One is the preservation of the natural environment and history [preservation of natural and farmland landscapes and cultural heritage] and the preservation of major agriculture [preservation of nature and farmland landscapes and cultural heritage].

The second is “Mix” [mixed development, promoting the mixing of different income classes]

Mixed-use developments are popular, but by my "mix" I mean [mixed-use developments, encouraging a mix of income levels] with different incomes and age groups [mixed developments, encouraging a mix of income levels] and a variety of land uses.

A city that makes you want to walk [Roads that encourage walking, human-sized streets]

Great cities people enjoy walking [walking roads, human-sized streets]

I don't go where I can't walk

Where you go on vacation is where you can enjoy a walk.

Then why not make it possible to walk anywhere?

Bicycles are our most efficient means of transportation [bicycle network and pedestrian zone]

China has adopted a policy of six-meter bike lanes on all roads [cycle networks and pedestrian zones].

They're seriously thinking about getting back to biking.

(Applause) This is a complex challenge for planners: how to connect roads.

A road network that allows you to choose from a variety of routes, not just a single route.

Vehicles [High quality transportation, cheap express bus network]

We should invest more in transportation [high-quality transportation, cheap express bus network]

there is no magic solution

self-driving cars won't solve

In fact, self-driving cars will result in more traffic and more miles driven than any other solution.

And concentration [urban density and mix proportional to traffic capacity]

Cities have a hierarchy based on transport [city density and mix proportional to traffic capacity] instead of the old highway skeleton

It's a big paradigm shift, but the two must reconnect to shape the fabric of the city.

I have high hopes for [overcoming sprawl around the world]

In California, in the United States, in China, these changes are widely accepted.

I'm hoping for two reasons.

One is that most people know—

Instinctively, we all know what a great city looks like.

The second is that the kind of analysis that we can try now allows people to connect the dots and create political unity that has never happened before.

People will be able to create the kind of community that we all need.

thank you

(Applause) (Chris Anderson) Self-driving, self-driving cars

It's very interesting for everyone here.

Do you have any doubts or concerns about it?

(Peter) I think it's overheating.

First, everyone says there will be a lot less cars in the future.

But nothing is said about increasing vehicle mileage.

there will be more cars on the road

more traffic jams

CA: Self-driving cars are so fascinating because they drive while you're reading or sleeping.

(Peter) One of the reasons is

For privately owned vehicles, it means that people drive longer distances.

that would encourage sprawl

If you work while commuting, you can live further away

This will reinvigorate sprawl, something that I deeply fear.

The other is taxis, and according to a series of surveys, half of people don't want to share a taxi.

If you don't share, vehicle mileage will increase by 90%

30% increase in vehicle mileage even with sharing

Chris: When you say share, it's like intelligent ridesharing, where multiple people share a ride, right?

(Peter) Like sharing a self-driving Uber

In reality, it is possible to increase the efficiency of car usage, whether it is self-driving or not.

They claim that electric cars are the only efficient vehicles, but they're not.

The real conclusion is that walking, biking, and transit will lead cities and local communities to thrive.

Putting people in separate cars, self-driving or not, is the wrong direction.

And frankly, it's horrifying to imagine an unmanned self-driving car being sent out on an errand like picking up takeout from McDonald's.

Chris: Thank you very much.

(Peter) Thank you. (Chris) Kudos for your work.

(applause)

Raise your hand if you've ever seen someone standing on the side of the road with a sign like this in your town.

i think everyone has

I wonder if everyone is honest Have you ever thought about it once?

If I give you a job, will you really take it?

What does that job mean to their lives?

I'm going to tell you the story of my city that clarified that question, changed the way we think about the act of begging, and tried to inspire people through the dignity of work.

“There's a Better Way”

I call this activity that because I believe there are better ways to get money than begging on the street.

I believe that if you want to help people in need, there's a better way than handing over money at the intersection.

work has dignity

I think people are more likely to invest in themselves when they know their communities are willing to invest in them.

We humans are kind and compassionate creatures, so giving money to someone in need makes us feel good.

But if you ask any beggar, most of them will tell you that they don't necessarily use the few dollars they give you to feed your appetite, but to buy drugs.

there's a better way

My name is Richard Berry and I have one of the best jobs in the world.

I am the mayor of the great American city of Albuquerque, New Mexico I am the mayor of the great American city of Albuquerque, New Mexico

On July 17, 2015, I had lunch in this wonderful city, and on my way back to City Hall, I saw a man standing at a crossroads.

As you can see, I have a sign and it says I want a job.

But if you look closely at this picture, you can see him standing under a blue sign that says, if you're in need and need food, shelter, or want to make a donation, call 311 for Community Services.

So why is this man standing under our city's sign with this sign?

When I put up the sign, I was worried that I would get a phone call, but it did. I got 11,000 calls.

We installed this sign at 30 intersections.

And they actually provided food, lodging and other services.

And yet he's standing under a city sign with a sign that says I want a job.

Simple - he wants a job

So I decided to do something rare in government.

Instead of complicating the solution, I tried to make it simpler.

I went back to my office and gathered the staff and said, "We're going to take this man and people like him at their word."

"If he wants a job, we'll provide it, and in the process, make our city a better place."

Albuquerque is such a beautiful place

At an altitude of about 1,600 meters, there is Mount Sandia in the east, and the Rio Grande River flows through the center of the town, which is also the home of the Albuquerque International Balloon Festival.

On days like today, you can literally ski in the morning and play golf in the afternoon.

But there are still things to do: weeding and picking up trash.

There are two things you need to ask yourself when you're doing something new for your city.

First, is there anything left to do in your town?

If the answer is no, can you give me the mayor's phone number, so I can give you some advice?

(Laughter) But the second thing you should ask is this: Is there a working solution for begging in your town?

If you're taking a punitive approach, like Albuquerque used to be, handing out tickets to beggars and money givers, I don't think the solution is working.

If you have things to do and you need people who want to do something, there's a better way.

Fortunately it's not that complicated

This is a 2006 Dodge van.

It was left unused in my parking lot.

We changed the tires and put the logo on it.

This van goes to the street where there are beggars - we'll come see you.

Park the van, go outside and ask them if they'd rather have a day job than begging.

Do you really think they'd want to -- in an hour or so in the morning, the van would fill up, because almost everyone would take the job if you called them out.

But we need more than just a van

I need an awesome human being to drive that van.

And the most wonderful person is Will

he wears a yellow vest

Will works for a local nonprofit partner.

he works with homeless people every day

They trust Will, Will trusts them, he struggles

Let's say, "Where there's a will, there's a way."

If you're running a Better Way campaign in your town, you need someone like Will, because he's one of the keys to the success of business here in Albuquerque.

We also need great nonprofit partners.

In our case it's the St. Martin Hospitality Center.

They've been involved in our community for over 30 years.

They provide counseling and food shelter, and if that's not possible, they point you to other places that can provide it.

But to me as mayor, they're more than that.

provides agility

It takes me two weeks, sometimes two months, to get my employer to work in Albuquerque.

So imagine, in my old van, the most amazing human being, Will, or his wonderful local nonprofit partner, drives down the street, sees a beggar, and asks, "Would you like a day job?"

The person says, "Yes," and Will says, "Then I'll come pick you up in six weeks."

(Laughter) That doesn't work.

Agility is very important for our program.

They do the paperwork, they insure them, they do all the paperwork that I can't do quickly.

We pay the people we hire $9 an hour.

provide one meal on site

At the end of the day, our old van takes them to St. Martin, where they receive counseling services.

So far, in the last two or three weekly pilot programs, we've cleared 400 blocks of the city of Albuquerque with one super cool guy and one Dodge van.

Collected more than 53 tons of garbage and weeds

I don't know if anyone has weighed the tumbleweed, but it's not very heavy, so you can imagine the volume of what was recovered.

Albuquerque has 6,000 city hall employees and a very nice waste disposal department.

At the end of the day, we put out our trucks, and the staff of that department helps the homeless people with the garbage that they've collected for the day and takes them to the landfill.

I'm lucky to have staff who work with and work with homeless people.

You're making your city a better place at the same time that you're improving your own quality of life.

Also, everything you do costs money.

Fortunately, this program doesn't cost much.

We started with one old van, one amazing human being, a great local nonprofit, and a budget of $50,000.

But we also needed the trust of the community.

Fortunately, we built that trust years before we started this business.

A program called "Albuquerque Heading Home" is a housing first initiative that puts long-term homeless people in their homes.

To date, we've homed 650 long-term homeless people, and they're the medically vulnerable, the people most likely to die on the streets.

We asked a local university to do research.

I found that I could save 31.6% in taxes compared to just letting myself struggle to survive on the streets.

We saved 5 million dollars while giving homes to 650 people.

We had the trust of our community, but as a community, we needed more honest dialogue, because we needed people to understand. When we gave five dollars out the window, we were actually minimizing our chances of helping people in need.

If you donate that $5 to our shelter, we'll feed seven people.

By donating to our local food banks and food pantries, we can actually feed 20 people.

People say, "Albuquerque is a big city of 600,000 people, but it doesn't work in my town. My town is either too big or too small."

I don't think so. If there's at least one beggar on each block, we can do it.

You can do it even if you live in a big city of 8.5 million people.

It doesn't matter what your occupation is

What matters is whether the work has dignity.

no matter what the job

I think any town can do this.

Some of them said to me, "Mayor, that's a little too simple.

It won't work,' some say.

But I can tell you that if you go out into the street and treat beggars with dignity and respect, and maybe for the first time in years, or maybe for the first time in their lives, tell them you trust them, and the place is their town, your town, and you actually need their help to make it a better place, even though you know you're not going to solve all their problems, at least that action is the first step in making something great happen.

When you take them out to work and start working together, you see amazing things happen.

They feel teamwork, they feel they can make a difference.

And when they come home to St. Martin in their old Dodge van at the end of the day, they're more likely to attend whatever service they need, substance abuse, mental health counseling, whatever.

So far, our pilot program has provided a total of about 1,700 days of work.

Connected 216 people to permanent employment opportunities

Twenty people actually qualified for Housing First and went home in this project, they were given a home.

And the Better Way program has connected more than 150 people to mental health services for substance abuse.

This is me two weeks ago in St. Martin doing our biennial survey.

I'm having a conversation with a man who lives on the home, to get information about him to find out where he came from, how he came to be on the home, and what help he needs.

I think you've noticed that he has the same autograph as the man I saw in 2015, the same autograph I brought with me today.

We have to ask ourselves, is the current situation improving?

definitely improving

Albuquerque is leading the way in tackling the intractable social problems we face today.

The Albuquerque Heading Home and Better Way programs reduced Albuquerque's homeless homeless population by 80 percent last year.

Since becoming mayor, I've been able to reduce our city's long-term homeless population by 40 percent.

We were also able to systematically achieve "zero net homelessness," as defined by the Department of Housing and Urban Development, for veterans in Albuquerque.

(Applause) I'm happy to report that other cities are hearing about this. I've been contacted by several mayors -- Chicago, Seattle, Denver, Dallas -- and they're starting to implement programs that respect the dignity of work.

I can't wait to learn from them.

I can't wait to see what experiences they'll have and what pilots they'll do so we can begin a national collective approach through dignity at work.

And I want to commend the mayors and the community nonprofits that do this work.

who's next?

Are you and your town ready to improve?

Are you ready to change the way you think about these deep-rooted social issues?

Are you ready to inspire your community through the dignity of work and radically improve your city in many ways?

If you're ready, I'm sure you'll find a better way.

thank you

(applause)

I want to give you a new perspective on my field of expertise, artificial intelligence.

I believe that the purpose of AI is to augment human capabilities with machine intelligence.

As machines get smarter, so do we.

I call this "human AI," artificial intelligence designed to work with people and extend their capabilities to meet their needs.

Today, I'm happy to say that the idea of ​​intelligent assistants has become mainstream.

It's a widely accepted metaphor for the interface between humans and AI.

One of my projects is "Siri"