The last person you were in front of the baby happened to be my granddaughter Mithra.

Isn't she great?

(Laughter.) But when she popped out, even though her brain had actually been developing for months based on her experience in the womb, she was nonetheless very limited in her abilities, like all babies at normal natural term.

Any assessment of her perceptual abilities would be crude.

There is no real indication that any serious thought is going on.

In fact, there is little evidence that very young infants have cognitive abilities.

Toddlers are less responsive.

There aren't many signs that people are actually on board.

(Laughter) And they can only control their movements in a very primitive way and in a very limited way.

It will take several months before the infant can do such a simple thing as reaching out and grabbing an object under voluntary control, usually bringing it to his mouth.

And it will be months ago. And we see a long, steady progression of evolution from the first wriggling to rolling, sitting, crawling, standing and walking until we reach a magical point where we can motivate ourselves in the world.

Yet when we look to the future in our brains, we see truly remarkable progress.

By this age, the brain can actually remember.

Store, record, and quickly retrieve the meaning of thousands or tens of thousands of objects, actions, and their relationships around the world.

And those relationships can actually be built in hundreds of thousands, possibly millions, of ways.

By this age, the brain controls very sophisticated perceptual abilities.

And in fact, the repertoire of cognitive skills is growing.

This brain is just a thinking machine.

And at this age, there is absolutely no question that humans are on this brain.

And indeed, at this age, it practically controls its own self-growth.

And by this age, we find that the ability to control movement has undergone an amazing evolution.

Movement has now advanced to the point where movements can be controlled practically simultaneously in complex sequences and in complex ways, such as is required to play complex games such as soccer.

Now this boy can bounce a soccer ball over his head.

And in São Paulo, Brazil, where this boy is from, about 40 percent of boys his age have this ability.

Even in the community of Monterey, it would be difficult to find a boy with this ability.

If so, he's probably from São Paulo.

(Laughter) What this means is that our individual skills and abilities are greatly influenced by our environment.

That environment pervades our modern culture and is what challenges our brains.

Because what we have been doing in personal evolution is building a large repertoire of specific skills and abilities that are unique to our own personal history.

And in fact they are a wonderful differentiator for humanity, in fact no two people are exactly alike.

Each of us has different acquired skills and abilities, but they all stem from the plasticity, adaptability of this truly amazing adaptive machine.

Of course, in our adult brains, we have built up a large repertoire of learned skills and abilities that we can perform more or less automatically based on memory, which define us as living, moving and thinking creatures.

Today, as geek university scientists in our lab, we study this by making the brains of animals such as rats, monkeys, or these particularly curious creatures, one of the strangest life forms on the planet, learn new skills and abilities.

And we try to track the changes that happen when we acquire new skills and abilities.

In fact, we do this with individuals of all ages, these different species, from infancy to adulthood to old age.

Thus, for example, we might involve rats in acquiring new skills or abilities in which they use their front paws to master specific hand-grabbing behaviors, just as we examine children and their ability to master their subskills, or general holistic skills to achieve something such as mastery of reading comprehension.

Alternatively, we might focus on older people who have acquired complex abilities related to reading sheet music and performing mechanical playing acts that apply to playing music.

From these studies, we defined two major epochs in the history of brain plasticity.

The first great age is commonly called the "critical age".

And that's when the brain is setting up its basic processing machinery in its nascent form.

This is actually a period of dramatic change, and learning itself is not required to drive early differentiation of brain machinery.

For example, in the field of sound, all you need is exposure to sound.

And indeed, the brain depends on the sound environment in which it grows.

For example, I can raise animals in an environment where there is a repertoire of meaningless and silly sounds, sounds that I make. This is artificially important for animals and their young brains and is created just by exposure.

And what I have seen is that the animal brain sets up the initial processing of that sound in an idealized form, within its processing output, in order to represent that sound in an organized and orderly way.

Sounds do not have to be of value to animals. Animals can also be fed with virtual values, such as sounds that simulate the sounds of a child's native language.

And we see that the brain actually develops specialized processors dedicated to its complex array, its repertoire of sounds.

It actually exaggerates the separability of representations in terms of multidimensional neuronal representations.

Alternatively, you can make animals hear sounds that are completely nonsensical and destructive.

Under moderately loud ceiling fans, animals can be raised in conditions similar to raising babies in the presence of continuous noise.

And when I do that, I actually specialize my brain as the master processor of that meaningless sound.

And as a result, they are frustrated with their ability to express meaningful sounds.

Things like that in the early history of babies also happen in real babies.

And they explain, for example, the spectacular evolution of language-specific processors in all normally developing babies.

And so it also causes a significant number of children to develop defective processing skills, resulting in more limited verbal abilities as they get older.

Now, in this early stage of plasticity, the brain actually changes outside the context of learning.

You don't have to pay attention to what you hear.

Input does not necessarily have to be meaningful.

You don't have to be in a behavioral context.

This is necessary to set up the processing so that the brain can act discriminatively and act selectively, so that the creature wearing it, the one carrying it, can begin to act on the brain in a selective way.

In life's next great age, the brain is actually refining its machinery, mastering a wide repertoire of skills and abilities.

And this age lasts from the end of the first year of life until death. We are actually doing this under behavioral control.

It can also be said that the brain has a strategy to define the importance of inputs to the brain.

And it focuses on one skill after another, or one ability after another, under specific attentional control.

It is a function of whether the behavioral goal is achieved or whether the individual is rewarded for the behavior.

This is actually very powerful.

This plasticity and lifelong ability of the brain to change is powerfully expressed.

It is the basis of our true differentiation and what separates us from each other.

We can observe the brains of animals working on specific skills, and we can witness and record this change on many levels.

So let's do a very simple experiment.

In fact, this research was carried out about five years ago in collaboration with scientists from the University of Provence in Marseille.

This is a very simple experiment, in which monkeys are trained to handle a tool of the same difficulty as a child learns to handle and handle a spoon.

In fact, monkeys mastered this task in about 700 practice trials.

Therefore, the monkey was initially unable to perform this task at all.

The success rate was about 1 in 8.

Those attempts were meticulous.

Each attempt was significantly different from the others.

But gradually the monkey developed a strategy.

And after about 700 tries, the monkey did it perfectly, never failing.

He uses this tool every time to retrieve food successfully.

At this point the task is being executed in a beautiful and formulaic way. So beautifully regulated and highly repetitive from trial to trial.

You can look down on the monkey brain.

And you can see that it's distorted.

We are able to track these changes and have tracked many such behavioral changes over time.

And here we see the distortion reflected in the map of the skin surface of the monkey's hand.

Now, this is a map on the surface of the brain, where very sophisticated experiments have reconstructed responses by location with very detailed response mappings of neuronal responses.

Here you can see a reconstruction of how the hand is represented in the brain.

The exercise actually distorted the map.

and it is shown in pink. There are some larger fingertip surfaces.

These are the surfaces monkeys use to operate their tools.

Observation of response selectivity in the monkey cortex shows that the monkey indeed modifies the filter characteristics representing the input from the fingertip skin being manipulated.

In other words, a single, simple representation of a fingertip still exists in the most organized cortical regions of the skin surface of the body.

Monkeys are just like you.

Moreover, it is now expressed with considerably finer granularity.

Monkeys are getting more detailed information from these surfaces.

And that's the unknown part of acquiring skills and abilities. Perhaps you are the unlikely part.

Now, we actually looked at several different cortical areas in monkeys learning this task.

And each of them changes in ways that are specific to their skills and abilities.

So, for example, we can focus on cortical regions that represent inputs that control the monkey's posture.

We look at areas of the cortex that control specific movements, sequences of movements required for behavior, and so on.

They are all modified. They all become specialized for the task at hand.

There are 15 to 20 cortical areas that change in particular when mastering such a simple skill.

And it makes a really big difference in your brain.

It represents in a reliable way changes in the responses of tens of millions, and possibly hundreds of millions, of neurons in the brain.

It represents changes in hundreds of millions, perhaps billions, of synaptic connections in the brain.

It is built through physical change.

And the level of construction that occurs is massive.

Consider the changes that occur in a child's brain during the process of acquiring general motor skills.

Or acquire proficiency in your native language.

The change is massive.

The point is to selectively express what is important to the brain.

Because for most of the life of the brain, this is under the control of behavioral context.

That's what you pay attention to.

That's what makes it worthwhile for you.

It sees the brain itself as something positive and important to you.

It's all about cortical processing and forebrain specialization.

And that is the basis of your specialization.

That's why you are a unique specialist in your various skills and abilities. In other words, they are specialists in the details of the physical brain, very different from the individual brain of 100 years ago. It is very different in details from the average individual's brain 1000 years ago.

Now, one of the characteristics of this process of change is that information is always contextually related to other inputs and information occurring immediately.

That's because the brain constructs representations of things that are correlated in small moments in time and interrelated in successive small moments in time.

The brain records all information and causes all changes in temporal context.

Now, by far the most powerful context that has arisen in your brain is you.

In your history, billions of events have happened that are related in time to you as the receiver, or you as the doer, you as the thinker, or you as the mover.

Billions of times, tiny shards of sensation have entered the surface of your body and are always associated with you as a recipient, which brings you into the embodiment of who you are.

You are constructed and your self is constructed out of these billions of events.

Built. It's made in your brain.

And it is created in the brain through physical changes.

This is a wonderfully constructed thing that results in an individual form. Because each of us has vastly different histories and vastly different experiences, which gives us this wonderful differentiation of selves and personalities.

We are now using this research not only to delineate how normal people develop and their skills and abilities, but also to understand the origins of dysfunction and the differences and variations that can limit the abilities of children and adults.

I talk about using these strategies to actually design a brain plasticity-based approach that facilitates modification of the child's machine that enhances the child's ability as a recipient and user of language, and subsequently as a reader.

And I'll talk about the experiments that involve using this brain science in action. The first is to understand how it contributes to age-related loss of function.

And using it with a targeted approach seeks to differentiate machines for restoring function in old age.

The first example I'm going to talk about concerns children with learning disabilities.

We now have a large body of literature demonstrating that the underlying problem with the majority of children with premature speech impairment who struggle to learn to read is that their language processing apparatus is flawed.

And the reason it rises in its defective form is that babies' brains are noisy with mechanical processes early in life.

It's that simple.

It's a signal-to-noise issue. have understood?

And there are many things that contribute to it.

There are many inherited faults that can increase process noise on your machine.

Now, we might say that noise problems can also arise based on the information we receive from the world through our ears.

If there is, as the older people in the audience know, when I was a child, we understood that a child born with a cleft palate would be born with so-called mental retardation.

They knew their cognitive abilities would slow down. I knew they would have trouble developing normal language skills. And we knew they would have trouble learning to read and write.

Most of them will be intellectual and academic failures.

It has disappeared. That is no longer the case.

Inherited weaknesses, inherited conditions are gone.

I don't hear about it anymore. Where did you go?

Well, about 35 years ago, a Dutch surgeon understood that the brain was still in its early stages of plasticity, and that nothing of the sort would happen if we fixed the problem early, within the first set-up time of the critical period when this machine could be set up properly.

What are you doing in surgery to fix your cleft palate?

Basically, you're opening a tube that drains fluid from the middle ear, which is definitely filled.

All the sounds the child hears remain unmodified and muffled.

It's deteriorating.

If your child's native language is not English.

It's not Japanese.

It's muffled English. It's bad Japanese.

Shit.

And the brain specializes in it.

It creates a crappy representation of the language.

And the kid sticks to it.

Now the problem doesn't just happen in the ears.

It can also occur in the brain.

The brain itself can be noisy. It's normally noisy.

There are many inherited faults that can add noise.

And the native language of a child with such a brain deteriorates.

not in english. Noisy English.

And the result is a flawed representation of the unusual sounds of words by different strategies, by machines with different time constants and different space constants.

The brains of such children can then be examined and their time constants recorded.

They are about an order of magnitude longer than normal children, averaging about 11 times longer.

The spatial constant is about three times larger.

Such children have deficits in memory and cognition in this area.

Of course I would. Because, as recipients of language, they receive it, they express it, and they express nonsense in information.

And they will have poor reading comprehension.

Because reading depends on translating the sounds of words into this orthographic or visual representation.

If the sound of a word cannot be represented in the brain, the translation is meaningless.

And you end up with the corresponding abnormal neurology.

And these children increasingly document their abnormal neurology in assessment after assessment, language manipulation, and reading manipulation.

The point is, you can train your brain from there.

The way we think about this is that by actually changing the machine, we can recalibrate the processing power of the machine.

We will make detailed changes. It takes about 30 hours on average.

And today, we've helped nearly 430,000 children do just that.

In fact, there are probably about 15,000 children in training at the time we speak.

And when you actually look at the impact, the impact is substantial.

So let's take a look at the normal distribution.

We are most interested in those children on the left side of the distribution.

This is from about 3,000 children.

You can see that most of the children on the left side of the distribution have moved either to the middle or to the right.

This is a rough assessment of their language ability.

This is like an IQ test for language.

If you trained all children in the US, the effect on the distribution would be to shift the entire distribution to the right, narrowing the distribution.

This is a pretty big impact.

Consider a language arts children's classroom.

Think of the children on the slow side of the class.

We have the potential to move most of those kids to the middle or right side.

In addition to accurate language training, it also corrects memory and cognition, speech fluency and speech production.

And an important language-dependent skill is activated by this training: reading comprehension.

And to a great extent, it repairs the brain.

Children's brains can be observed in a variety of tasks performed by scientists at Stanford University, MIT, UCSF, UCLA, and many others.

And for children with different verbal behaviors and different reading behaviors, we find that training normalizes neural responses that were complex and abnormal before they started.

The same approach can now also be used to address the issue of aging populations.

It's going south again where the machine is degrading from being a capable machine.

The noise is increasing in my brain.

And learning modulation and control is declining.

And you can actually look down into the brain of such a person and witness, for example, the changes in the time and space constants as the brain expresses language again.

Just as the brain first got out of chaos, it eventually returns to chaos again.

As a result, memory, cognition, postural ability and agility are impaired.

It turns out that the brains of such individuals, although this is a small group of such individuals, can be equally intensively trained for about 30 hours.

People between the ages of 80 and 90.

And we find that their immediate memory, ability to recall things with delay, ability to control attention, verbal ability, and visuospatial ability are significantly improved.

The overall neuropsychological index of trained individuals in this population is approximately 2 standard deviations.

That means that if you're sitting on the left side of the distribution and I'm observing your neuropsychological abilities, the average person is moving either to the middle or to the right side of the distribution.

This means that most people who are more or less immediately at risk of old age are now in a protected position.

My challenge is to try to rescue more of the elderly more completely and more. Because I think this can be done at scale in this area. And the same goes for children.

My main interest is how this science can be refined to address other diseases.

I'm particularly interested in major childhood scourges such as autism and cerebral palsy.

So are conditions of old age, such as Parkinson's disease, and acquired disorders, such as schizophrenia.

Your problem related to this science is how to maintain your own intelligent learning machine.

And of course, a disciplined life where learning is continuous is the key.

But brain aerobics can also help your future.

Please be prepared. Just as physical exercise is a regular part of life today, it will be a part of every life in the not too distant future.

Another way to finally think about this literature and science that is important to you is to think about how you nurture yourself.

As you know, science is now telling us that you are in charge, it is under your control, your well-being, your well-being, your abilities, your abilities can be continuously modified and continuously improved, and you are the responsible subject and party.

Of course, many people will ignore this advice.

It will take a long time before they really understand it.

(Laughter) That's another issue, not my fault.

have understood. thank you.

(applause)

Chris Anderson: Nick Bostrom.

I mean, you've already given us so many crazy ideas.

A few decades ago, I think you argued that we all might, or perhaps do, live in simulations.

Recently, I painted the most vivid example of how artificial general intelligence can go horribly wrong.

And this year you are about to publish a paper that presents what you call the Fragile World Hypothesis.

And our job tonight is to illustrate it.

So let's do it.

What is that hypothesis?

Nick Bostrom: It's trying to think about a kind of structural feature of the current human condition.

You like the pot analogy, so I'll use that to explain.

So imagine a big jar full of balls representing ideas, methods and possible technologies.

The history of human creativity can be thought of as the process of reaching into this urn and taking out ball after ball, and the final effect so far has been very beneficial.

We have extracted so many white balls, different shades of gray and mixed blessings.

We have not yet taken out a black ball, a technology that will inevitably destroy any civilization that finds it.

So this paper tries to figure out what such black spheres are.

CA: So you're defining the ball as necessarily bringing about the destruction of civilization.

Note: Unless you get out of what I call the semi-anarchic default state.

But by default, in a way.

CA: So you're making a convincing case by giving some kind of counterexample to believe that we might have actually gotten lucky so far and unwittingly pulled out the deathball.

I have this quote, what is this quote?

Note: Well, I think it's just meant to illustrate the difficulty of predicting what results a basic discovery will have.

we don't have that ability.

Because you've gotten pretty good at pulling the ball out, but you still don't have the ability to put the ball back in the pot.

We can invent, but we cannot uninvent.

So our strategy, as it stands, is to hope we don't have a black ball in the urn.

CA: So I guess we were lucky because once it's out, it's out and you can't put it back in.

Now let's look at some of these examples.

You are talking about different kinds of vulnerabilities.

Note: So the easiest to understand is technology that causes massive destruction very easily.

Synthetic biology may be a rich source of black spheres of its kind, but there are many other possibilities. Think geoengineering. Really great, right?

We can fight global warming, but we don't want it to be too easy either. I don't want random people and their grandmothers to have the ability to radically change the Earth's climate.

Or it could be a swarm of lethal autonomous drones, mass-produced mosquito-sized killer bots.

Nanotechnology, general artificial intelligence.

CA: In your paper, you argue that when we discovered that atomic energy could make bombs, it was just a matter of luck that we might have been able to make bombs with simpler resources that everyone had access to.

Note: Yes, remember the 1930's. There, we made a breakthrough in nuclear physics for the first time, and some genius discovered that it was possible to set off a nuclear chain reaction, which could lead to a bomb.

Further research revealed that highly enriched uranium or plutonium was needed to make a nuclear bomb, a material that is very difficult to obtain.

Large amounts of energy are required, such as ultracentrifuges and reactors.

But instead, suppose it turns out that there is an easy way to unleash the atomic energy.

Maybe you could have caused a nuclear explosion by baking sand in a microwave or something.

So I know it's physically impossible.

But how could we know what it would be before we did the physics involved?

CA: But the evolution of life on Earth implies a kind of stable environment, and if it were relatively easy for large-scale nuclear reactions to occur, the Earth would never have been stable and we wouldn't be here.

Note: Well, unless something is intentionally made easy, it doesn't happen by chance.

So we can stack 10 blocks on top of each other, just like we can easily do, but in nature we don't find 10 blocks stacked on top of each other, for example.

CA: Well, this is probably what most of us worry about the most. Yes, synthetic biology is probably the fastest route we can foresee to get here in the near future.

Note: Well, let's think about what it would mean if someone could destroy a city just by working in the kitchen for an afternoon.

It is difficult to understand how modern civilization as we know it could have survived it.

Because there will always be those in a population of one million who, for one reason or another, choose to use its destructive power.

So if an apocalyptic remnant chooses to destroy the city, or worse, the city will be destroyed.

CA: Now let me introduce another type of vulnerability.

Please talk about this.

Note: Well, in addition to this obvious type of black sphere that allows many things to be blown up, other types of spheres would also work by creating bad incentives for humans to do harmful things.

So Type 2a, as you might call it, is thinking about some kind of technology that encourages a great power to use its vast force to create destruction.

I mean, nuclear weapons were actually very close to this, right?

What we did was spend over $10 trillion to build 70,000 nuclear warheads and put them on immediate alert.

And on several occasions during the Cold War, they nearly blew up each other.

It's not because many people thought it was a great idea. Let's all spend $10 trillion and blow ourselves up. But the incentive was so great that we ended up discovering ourselves. This could have been worse.

Imagine if there was a safe first strike.

It would have been very difficult, then, to refrain from launching all nuclear missiles in a crisis situation.

At the very least, you worry that the other person might do it.

CA: Well, Mutually Assured Destruction made the Cold War relatively stable. Without it, we might not be here now.

Note: It may have been more unstable than it actually is.

And technology can have other properties as well.

If nuclear weapons had been replaced by something smaller or less distinctive, it might have been more difficult to reach an arms treaty.

CA: And you're worried not only about bad incentives for powerful actors, but bad incentives for all of us who are Type 2b here.

Note: Well, let's take global warming as an example.

There are lots of little conveniences that each of us does that individually don't have a big impact, right?

But when billions of people do it, it has a cumulative detrimental effect.

Well, global warming could have been even worse than it is now.

Now you have the climate sensitivity parameter.

This is a parameter that tells us how much warmer it would be if we emitted a certain amount of greenhouse gases.

But suppose that the amount of greenhouse gases we emit causes the temperature to rise to 15 or 20 degrees Celsius by 2100, rather than say 3 to 4.5 degrees Celsius.

Well, we may have been in a very bad situation then.

Or suppose renewable energy deployment was much more difficult.

Or maybe there were more fossil fuels in the ground?

CA: If that's the case, can't you argue that if what we're doing today was a 10 degree difference in the time period that we can see, humans would actually get serious and do something about it?

We are stupid, but we may not be that stupid.

Or maybe we are too.

Note: I don't bet on it.

(Laughter) You can imagine other functions.

I mean, it's a bit difficult to switch to renewable energy or something like that at the moment, but it's possible.

But if the physics were slightly different, it could have cost a lot more to do these things.

CA: So Nick, what's your opinion?

Taken together, do you think that this planet, our human race, is a fragile world?

Is there a deathball in our future?

Note: it's hard to say.

Or rather, it feels like there may be various black balls in the jar.

There may also be some gold balls to help protect yourself from the black balls.

And I don't know what order they come out in.

CA: So one of the possible philosophical criticisms of this idea is that it implies a view that the future is inherently resolved.

Either the ball is there or it isn't.

And in some ways it's not the future I want to believe.

The future is undecided, I want to believe that today's decision will determine what kind of ball will be taken out of the urn.

Note: So if we just keep inventing, we'll end up getting all the balls out.

So I think there's a sort of weak form of technological determinism that's pretty plausible, like you're unlikely to encounter a society that uses flint axes or jets.

But technology can be thought of as a set of affordances.

Technology is something that makes it possible to do various things in the world and bring about various effects.

How to use it is, of course, up to human choice.

However, when considering these three types of vulnerabilities, the assumptions about choosing how to use them are very weak.

So a Type 1 vulnerability, which is also this huge, destructive force, is a pretty weak assumption to think that there will be someone out there in the millions of people who will choose to use it destructively.

CA: To me, the most disturbing argument is that we might actually have some perspective on the urn, and it's very likely that it will actually doom us.

So if we believe that power accelerates, that technology inherently accelerates, that we build tools that make us more powerful, then at some point we get to the point where one individual can defeat us all, and then we seem screwed.

Isn't this discussion very disturbing?

Note: Oh yes.

(Laughter) I think -- well, we have more and more powers, and it's getting easier and easier to use those powers, but we can also invent technology to help control how people use those powers.

CA: So let's talk about it, let's talk about reaction.

Given all the possibilities that exist today, let's assume that our future could be severely doomed, not just for symbio, but also for cyber warfare, artificial intelligence, and more.

What can be done?

We also discussed four possible responses.

Note: Limiting technological development does not seem promising if we are talking about a general cessation of technological progress.

I don't think it's possible, and I don't think it's desirable.

I think there are very few areas where you probably want to slow down technological progress.

I think you don't want more advances in bioweapons or, say, isotope separation to make nuclear production easier.

CA: I mean, I used to totally agree with that.

But I would actually like to rebut that a bit.

First of all, if you look at the history of the last few decades, it's always been full steam ahead, so okay, it's our only choice.

But when you look at globalization and its rapid acceleration, when you look at the strategy of “act fast and break things” and what happened, and when you look at the possibilities of synthetic biology, it's hard to tell whether we should move rapidly or without limits towards a world where every home and high school lab can have a DNA printer.

There are some restrictions, right?

Note: The first part is probably not feasible.

If you think it's better to stop, there's a feasibility problem.

So it doesn't help much if one country does -- CA: No, it doesn't help if one country does that, but we've had treaties before.

That's how we actually survived the nuclear threat, by going out there and going through the painful process of negotiation.

I just wonder, isn't the logic that, as a global priority, we shouldn't start negotiating very strict rules about where synthetic bio-research should take place now, and that's not what we want to democratize?

Note: I totally agree with that too. For example, a DNA synthesis machine would probably be preferable as a service rather than as a product where each lab has its own equipment.

There are probably four or five places in the world where you send your digital blueprints and get your DNA back.

And if one day you really need it, you'll be able to get a finite set of chokepoints.

Therefore, I would like to look for special opportunities that can be more tightly controlled.

CA: So, fundamentally, your belief is that you can't succeed just by persevering.

Somebody, somewhere, it's North Korea, someone will go there and discover this knowledge, if they can find it there.

Note: It's plausible in the current situation.

It's not just synthetic biology.

So any significant new change in the world can become a black sphere.

CA: Let's look at another possible response.

Note: I think this is also a limited possibility.

So the reappearance of Type 1 vulnerabilities means we can reduce the number of people who are motivated to destroy the world, and if they have the access and the means, that's a good thing.

CA: In this image you asked us, we imagine drones flying around the world using facial recognition.

When they find someone showing signs of antisocial behavior, they pour their love in and fix it.

Note: I think it's kind of like a hybrid photo.

Eliminating can mean confining or killing, or convincing them of a better worldview.

But the point is, let's say this is so successful that the number of such people has been cut in half.

And if you want to do it by persuasion, you will be competing with all the other powerful forces trying to persuade people, political parties, religions, and educational systems.

But even if we could cut it in half, I don't think the risk would be cut in half.

Maybe 5 or 10 percent.

CA: You are not advocating betting the future of humanity on Response 2.

Note: Trying to dissuade or persuade people is fine, but you shouldn't rely on it as your only safety net.

CA: How about three?

Note: I believe there are two general methods that can be used to achieve the ability to stabilize the world against all possible vulnerabilities.

And you probably want both.

So one is a very effective ability to do preventive policing.

enough to intercept.

If someone starts doing this dangerous thing, you can stop and stop them in real time.

So this would require ubiquitous surveillance and everyone would be watched all the time.

CA: This is essentially a kind of "Minority Report."

Note: There will probably be AI algorithms, or some big free center considering this.

CA: Did you know that the term mass surveillance is not very popular today?

(Laughter) Note: Yes, imagine this little device as a necklace with a multi-directional camera that you have to wear all the time.

But to better communicate, call it a "free tag" or something like that.

(laughs) CA: Okay.

Note: In fact, it's clear that this alone has generated a great deal of controversy.

There are big problems and risks with that, right?

I may come back to that topic.

So one last, one more general stabilizing feature, kind of fills another governance gap.

So oversight becomes a sort of micro-level governance gap that prevents someone from doing something very illegal.

And there are corresponding governance gaps at the macro level and at the global level as well.

Addressing type 2a vulnerabilities requires the ability to reliably prevent the worst kinds of global coordination failures, avoiding great power wars, arms races and catastrophic commons problems.

CA: The term global governance is now clearly outdated, but would you argue that throughout human history, at every stage of the increasing power of technology, people have reorganized and some sort of centralized power?

For example, when mobile gangs of criminals could take over society, the reaction was, well, we have nation-states and centralized power in the police and military, so no, we can't do that.

Perhaps the logic that one human or a single group can destroy humanity means that at some point, at least somehow, it has to go this route, no?

Note: It is certainly true that the size of political organizations has increased over the course of human history.

It was once a group of hunter-gatherers, and there are chiefdoms, city-states, states, and now international organizations.

Again, I want to make sure that there is an opportunity to highlight that both mass surveillance and global governance clearly have significant downsides, and indeed significant risks.

What I'm pointing out is that with any luck, you could end up in a world where these are the only ways to survive the black sphere.

CA: The logic of this theory seems to be that you have to realize that you can't have it all.

It's like the naive dream many of us have that technology will always be a force for good. Keep moving forward, don't stop, go as fast as you can, and don't pay attention to some of the consequences. Actually, it's not an option.

It is possible.

If we have it, we have to accept some of the other very offensive things about it, and it's kind of like getting into an arms race: you want power, you better limit it, you better find a way to limit it.

Note: This is an option, and I find it a very attractive option. In some ways it's the easiest option, and while it might work, it means we're fundamentally vulnerable to extracting black balls.

Now, with a little tweaking, if we can solve this macro-governance problem and this micro-governance problem, I think we can take all the balls out of the urn, and we'll see big gains.

CA: So if we live in a simulation, does that matter?

Just reboot.

(laughter) Note: So...I...

(Laughter) I didn't think it was coming.

CA: So what's your take?

Combined, what are the chances of our doom?

(Laughter.) I love how people laugh when I ask that question.

Note: On a personal level, I feel like we are doomed anyway. If we only look at the time axis, we are rotting, aging, and many other things are happening, right?

(laughs) Actually, it's a little difficult.

If you want to be able to set probabilities, first, who are we?

If you are very old you will probably die of natural causes, but if you are very young it may take 100 years. The odds may vary depending on who you ask.

So what is that threshold, what counts as civilizational ruin?

In this paper, I don't need existential catastrophe for it to matter.

It's just a matter of definition, I say 1 billion deaths, or a 50 percent reduction in global GDP, but depending on what the threshold is, you'll get different probability estimates.

But you might dismiss me as a terrifying optimist.

(Laughter) CA: You're a terrible optimist, but I think you've created a lot of other terrible optimists...

(Laughter) Note: I'm talking about a simulation.

CA: In simulation.

Nick Bostrom, your brains are amazing, thank you so much for scaring us out of the daylight.

(applause)

When they asked me to come here, I thought, oh, this is TED.

And these TEDsters, you know, as innocent as their names are, are philanthropists, artists, and scientists who are shaping our world.

And do I need to say words that stand out enough to justify my participation in such a thing?

So I thought a really civilized-sounding British accent might help a little.

And I thought, "No, no." I should just go up there and speak as I am, as I am. After all, this is a great reveal.

So I wanted to come here and reveal my true voice to you.

As many of you already know, I'm from Queens, NY, so I speak Queens English.

(Laughter) But the theme of this session is, of course, invention.

I don't have any patents that I know of, but I'm going to show you some of my inventions today.

I think it's fair to say that I'm interested in my own inventions.

We are all born into specific circumstances with specific physical characteristics, unique developmental experiences, geographic and historical backgrounds.

But what then?

To what extent do we build ourselves and invent ourselves?

How do we identify ourselves, and how variable is that identity?

For example, what if you could be anyone at any time?

My characters, like my show characters, allow you to play with the spaces between questions.

So I brought some of them.

And well, they're so excited.

All I have to say is that they've each prepared their own little TED Talk.

So think of this as Sarah University.

(Laughter) Okay. have understood. oh well.

oh that's great.

Good evening everyone.

Thank you very much for being here today.

oh thank you My name is Lorraine Levin.

Oh my God! There are many people.

Hello sweetheart. have understood.

(Laughter) Anyway, I'm here because of a young girl named Sarah Jones.

She is a very nice young black girl.

Well, she calls herself black, but if you look closely, she's actually more of a caramel color.

anyway.

(Laughter) She brought me here because she put me on a one-man show that she calls her show.

And of course I know what that means.

I mean, she takes the credit and makes us come out here and do all the work.

I don't care though.

Frankly, I'm shivering just to be here with such a high profile person attending an event like this.

It's really amazing.

Of course, it's not just scientists and industry giants, but celebrities as well.

Many celebrities run here.

I've seen it -- Glenn Close, I've seen it before. i love her.

She was buying yogurt at Google Cafe.

Isn't it adorable?

(Laughter) There are a lot of other works, but they are all really great.

It's nice to know they care.

And—oh, I saw Goldie Hawn.

Oh Goldie Hawn. I love her too; she's great. yes.

As you know, she is half Jewish.

Did you know that about her?

yes. Still, it's a great talent. (Laughter.) And I felt so amazing when I saw her.

yeah she's nice

But anyway, I should have started by telling you how lucky I feel.

Being here is truly an eye-opening experience.

You all have a great responsibility for this world we live in today.

Well, a young girl would never have dreamed of that.

And you have made these advances in a very short period of time. You are very young.

I'm sure your parents would be very proud of you.

But I also appreciate the diversity you have here.

I found it very multicultural.

Standing here, I see different people.

It's like a rainbow.

It's okay to call it a rainbow. yes.

I just can't keep up if you can say otherwise.

What can I say and what can I not say?

I just don't want to offend anyone. Look.

But anyway, I think being here with all of you is literally the same as the brilliant young people who are the architects of our bright future.

Well, that's reassuring to me.

Even though, frankly, some of your presentations are horrible, downright horrible.

That's true. That's true.

What you are talking about is between environmental degradation and the collapse of global markets.

And of course I know that's what caused it all...

Well, I don't know how else to say it, so I'll say it my way. Ganewisz Stiklich from governments and bankers and Wall Street. You know

anyway.

(Laughter) The point is, I'm glad someone has a working idea to get us out of this mess.

Therefore, I salute each and every one of you and your glorious achievements.

Thank you for your efforts.

And congratulations on becoming a big maker enough to become a TED Meister.

We wish you continued success.

congratulation. Mazertov.

(Applause) Hello. Hi.

thank you everyone.

I'm sorry, but it's such a great opportunity and everything to be here right now.

My name is Noraida. And I'm just super excited to be at the TED conferences you're doing and things like that.

I am Dominican American.

In fact, you could say I grew up in the capital of the Dominican Republic, aka Washington Heights, New York City.

But I don't know if there are any other Dominicans here, but I know Juan Enriquez was here yesterday.

I think he's Mexican, so I'm honestly close enough to that for me right now. So -- (laughter) just -- I'm sorry.

I try not to be nervous because this is a great experience for me and for all.

And I'm just not used to public speaking, you know.

And when he gets nervous, he always starts talking fast.

As you can imagine, no one understands what I'm saying and it's very frustrating for me.

I usually have to try to stay calm and take deep breaths.

But on top of that, Sarah Jones told me I only had 18 minutes left.

That's why I think it's better to be nervous, maybe that's better.

And I'm just trying not to panic or panic. So take a deep breath.

have understood. sorry. Anyway, what I wanted to say is that I love TED.

Like, I love everything about this. very.

Well, it's--I can't get over this situation right now.

And where I'm from, people seriously wouldn't believe this even exists.

You know, I mean, like the name, I mean, I love TED.

I mean, I know this is a real person and everything, but I just think it's pretty cool that it's also an acronym, so I'm just saying that it's kind of like a very high concept or something like that.

i like that

And actually, I can relate to acronyms and all that.

Actually, I'm a sophomore in college now.

At my school, I was actually one of the co-founders of the organization. It's like leadership, and like you, you really love that and everything.

And the organization is called DA BOMB, A\and DA BOMB -- not like anything you can build or anything else -- it's like DA BOMB, it means like Dominica -- it's an acronym -- Dominican American Charity for Mothers and Babies.

So, you know, the name seems a bit long, but in light of the war on terrorism and all that stuff, the Director of Student Affairs has asked us to stop using the term DA BOMB and use everything so that no one misunderstands.

So basically, much like DA BOMB, what the Dominican American Mothers and Babies Charity is doing is basically trying to advocate for students with high academic potential who also happen to be mothers like me.

I am a working mother and also attend school full time.

And, as you know, having someone like a role model is very important.

I mean, I know our lifestyles are very different sometimes.

But like in my job, I just got promoted.

I'm a junior assistant to an associate director under the senior vice president of business development, so it's actually pretty exciting right now. That's my new title.

But whether you own your own company or are just starting out like me, I think things like this are very important for people to keep expanding their minds and learning.

And if everyone, like everyone else, really had access to it, you know, there would be a whole different world out there.

So I think all people need it, but especially when you look at people like me, Latinos, we're going to be in the majority in a couple of weeks.

Therefore, we are as eligible to participate in the idea exchange as everyone else.

So I am very happy that you are doing something like this and making your talks available online.

That's very good. I like that.

And I just love you guys. I love TED.

If you don't mind, I personally think of TED as an acronym for Technology, Entertainment, and Dominicans, now and in the future.

thank you very much.

(laughter) (applause) So that was Noraida. Like Lorraine and everyone else you meet today, these people are modeled after real people in my real life: friends, neighbors, family.

I come from a multicultural family.

In fact, the older woman you just met is based very loosely on my maternal great-aunt.

It's a long story, believe me.

But in addition to my family background, my parents also sent me to United Nations School, where I met many new characters, including my French teacher, Alexandre.

Well, it was elementary French that I took with her.

And it was Madame Bousson, you know, she was very [French].

She seemed like a typical French person in my class.

It was very chic, but it had a very ennui atmosphere.

And she was there, kind of talking to people in her class, talking about the existential waste of life.

And we were only 11 so it wasn't appropriate. (laughs) But [German].

Yes, I learned German for three years. I was the only black girl in my class at the United Nations School, so it was a great experience.

That said, it was great.

The teacher, Mr. Stupf, never discriminated.

I never have. He always, always, treated each of us the same excruciatingly during class.

So there were my teachers, and then my friends, my classmates from all over the world, many of whom are still dear friends to this day.

And they have inspired many characters as well.

For example my friend.

Well, I just wanted to say a quick good evening.

My name is Praveen Manvi. Thank you very much for this opportunity.

Of course, TED's reputation is ahead of its time around the world.

But, as you know, I'm from India, and when I first heard from Sarah Jones about the opportunity to come to TED in California, I was thrilled and, frankly, relieved. Because I am a human rights defender.

And usually my work goes to Washington D.C.

There, I have to attend these meetings, mingle with the troublesome politicians, and try to reassure me by telling them how often I eat curry in Georgetown. (Laughter) So you can imagine it.

So I am excited to be here with you all.

I wanted to spend more time with you, but that's for another time. have understood? wonderful.

(Applause.) And, unfortunately, I don't think I'll have time to meet the people I brought with me, but -- it's my first time here, so I'll try to behave.

However, I would like to introduce a few characters that those who have seen "Bridges and Tunnels" may know.

er, well, thank you.

Good evening.

My name is Pauline Ning. First let me say that I am of course a member of the New York Chinese community.

But when Sarah Jones asked me to come to TED, I said, First, I don't understand it. Two years ago, I would never have been in front of a large audience, much less. Because, as an immigrant, I feel that my English skills are not good enough to speak.

But I, like Governor Arnold Schwarzenegger, was determined to do it anyway.

(Laughter) My daughter wrote, "Always start your speech with humor."

But I would like to briefly tell you about my background.

My husband and I brought our son and daughter here in the 1980s to gain freedom that was not available in China at the time.

And we have tried to teach our children to be proud of their traditions, and it is very difficult.

As an immigrant, when I spoke to them in Chinese, they always answered in English.

They love rock music, pop culture, and American culture.

But when it comes time for them to grow up and start thinking about marriage, we expect them to understand their culture a little more.

However, I ran into some problems there.

My son says he's not ready to get married.

And he has a girlfriend, but she's an American woman, not a Chinese.

I said, "What's wrong with Chinese women?"

But I think he will change his mind soon.

So I decided to focus on my daughter instead.

A daughter's marriage is very special for a mother.

But first she said she wasn't interested.

She just wants to spend time with her friends.

And in college, she didn't seem to come home.

And she doesn't want me to visit her.

So I said, "What's wrong with this picture?"

So I accused my daughter of having some sort of secret boyfriend.

But she said to me, "Mom, don't worry about boys, I hate boys."

(Laughter.) And I said, "Sure, it can be difficult for men, but all women need to get used to it."

She said, "No mother, because I don't like boys. I like girls."

i'm a lesbian ”

So, I always teach my kids to respect the American way of thinking, but this was one of the exceptions to my daughter (laughs), and I told her she wasn't gay, she was just confused by this American issue.

But she said to me, "Mom, that's not American."

She said she was in love with a nice Chinese girl.

(Laughter.) Those are the words I want to hear, but they come from my son, not my daughter.

(laughs) But at first I didn't know what to do.

But over time, I came to understand that this was her.

So I want to share with you that, although it is still difficult at times, it helps us realize that society is becoming more tolerant because of places like this, thoughts like this, and the open minds of people like you.

So maybe TED is impacting people's lives in ways you may not even be aware of.

So, for my daughter's sake, thank you for your ideas worth spreading.

Thank you, thank you.

(Applause) Good evening. My name is Javi Bellajar.

And I want to first thank Sarah Jones for all the pressure she put on the lone Arab she brought with her to be the last one today.

I am from Jordan.

And I teach Comparative Literature at Queen's University.

Not Harvard University.

But I feel a little like a fish out of water.

But I am very proud of my students.

And it looks like some of them were here for the conference.

So you will receive the extra credit I promised.

But as you say, I know I may not look like the typical TED resident, but I want to stress that we are not as different as we appear in our global society.

So, if you don't mind, I'd like to share briefly some of the poems I memorized when I was a sixteen-year-old girl.

So back to ancient times.

[Arabic] Roughly translated, it says, "Please, let me hold your hand.

I want to hold your hand

I want to hold your hand

And when I touch you, I feel happy in my heart.

It's my love, a feeling that can't be hidden, can't be hidden, can't be hidden. ”

Well, that's fine, but please, please, but please.

If that sounds familiar, it's because I was listening to the Beatles at the same time in my life.

It was [unintelligible] on the radio and was very popular.

I mean, I'd like to believe that every word we're meant to deafen to each other will always have lyrics that rhyme and connect ears and hearts across continents.

And I hope this becomes a method we can invent for ourselves over time.

That's it, Shukran. Thank you very much for the opportunity.

have understood? wonderful.

(Applause) Thank you very much. it was adorable.

Thank you for calling me.

(Applause.) Thank you very much. I love you.

(Applause) Well, let me say this.

Just -- thank you.

I want to thank Chris and Jacqueline and everyone who brought me here.

It feels like coming home after a long absence.

And I know I've played in some of your companies, and you've seen me in other places, but I can honestly say this is one of the best audiences I've ever been to.

Everything is great, so why don't you all reinvent yourself soon?

(applause)

Ethik and her robot Hedge agree to help Resistance leader Adira sabotage the Art Incinerator Robot.

In return, Adira promises to lead them to the first objective of Ethic's quest, an artifact called the Node of Power.

A few years ago, there was only one Furnace Bot.

Inside the furnace was a 0 with an unknown, randomly generated serial number.

Over time, the original robot self-replicated to produce more identical Furnace bots.

Each child inherited the original unknown serial number within the furnace, and its shell was engraved with a random, unique serial number.

Generation 2 Furnace Bots likewise self-replicated, always passing their own serial number to descendant Furnace bots.

This continued for generations.

Each furnace bot now receives orders from its parent.

So if Ethic can find the original 0 bot and change its instructions somehow, she can take over an entire army at once.

Adira has the perfect solution. It's a data crystal she's carried around for years, waiting for the right moment to activate it.

It contains programs designed to control bots and give them new instructions.

However, if it is uploaded to a furnace bot other than the original, the 0 bot will override the order, destroying the data crystal in the process.

Feeding is only minutes away, and you only have one chance to pull it off.

Luckily, Hedge's data saving features come to the rescue.

In programming, information is stored in what are called variables.

Variables are basically containers that hold numbers, words, or other values.

How does Ethic program hedges to find the original 0 bot as quickly as possible?

Stop now and figure it out for yourself.

Here are some tips.

A program can be written to contain as many variables as desired, but only one solves this problem.

Hedge can use this to store the serial number and replace it with a new number as many times as needed.

Stop now and figure it out for yourself.

The key insight here is that Hedge doesn't have to plan out a whole series of relationships to find the original furnace-bot.

For example, if he gets lucky and picks the original right away, he's done with it.

But even if you started with other bots, you can find your way back directly to the 0 bot by following a simple set of instructions.

To make them easier to create, let's first simplify the problem.

Let's say you only have 3 furnace bots. I have two parents and two children, but I don't know which is which.

You can randomly pick one in the hedge and have a look inside its furnace.

Well, you can see that the family tree looks like this:

If the number in the furnace is 0, then the parent has been found.

Otherwise, whichever child you choose, the furnace must have the parent's serial number.

So in this scenario you are guaranteed to find the parent with one or two hands.

In fact, there are many Kamadobots, and I don't know how many generations there are or what the family tree looks like.

But hedges don't need to because they can keep repeating the same set of actions until the original action is reached.

how? with loop.

Hedge can randomly select any bot, inspect its furnace, and store its serial number as a variable.

Then we start the next loop which iterates until the stored variable is 0 which is the furnace number of the original bot. 1. Find the bot whose shell serial number matches the stored number.

2. Look inside the furnace.

3. Save the new number and overwrite the old number.

When the loop ends, we know that hedge found 0 bots and we need to upload the control program.

What happens is that Hedge only takes 5 iterations to find the original. Robot 733's furnace contains 0.

In the blink of an eye, the program spreads across the army, and Adira assumes control.

She caused a theatrical explosion of flames to hide the fact that the furnace robot was secretly protecting all of the works of art.

Adira honors the closing of the deal as Ethic has delivered the furnace robot.

She leads Ethic and Hedge to the location of the first artifact, the Node of Power.

One thing is immediately clear. that they must steal it.

Meet Lucy.

She majored in mathematics in college and got excellent grades in all courses in probability and statistics.

Do you think it's more likely that Lucy is a portrait artist or Lucy is a portrait artist who also plays poker?

In a study of similar questions, up to 80% of participants chose the second statement, that Lucy is a portrait artist and also plays poker.

After all, what we know about Lucy doesn't suggest an affinity for the arts, but statistics and odds are useful in poker.

Still, this is the wrong answer.

Look at the options again.

How can we know that the first statement is likely to be true?

because it's a less specific version of the second statement.

Saying that Lucy is a portrait painter makes no claims about what else she does or does not do.

But while it's much easier to imagine her playing poker than creating art based on background information, the second statement only holds true if she's done both of these things.

No matter how counterintuitive it may seem to imagine Lucy as an artist, the second scenario adds another condition that makes it less likely.

For any possible set of events, the probability of A occurring is always greater than the probability of both A and B occurring.

A random sample of a million mathematics majors might have a relatively small subset that are portrait painters.

But it will inevitably be a larger subset of portrait artists and playing poker.

Anyone who belongs to the second group belongs to the first group, but not vice versa.

The more conditions, the less likely the event will occur.

So why do statements with more conditions sometimes seem more reliable?

This is a phenomenon known as the join fallacy.

When we are asked to make quick decisions, we tend to look for shortcuts.

In this case, look for the plausible rather than the statistically most likely.

The fact that Lucy is an artist does not match the expectations formed by previous information.

Additional details about her poker play give us a story that resonates with our intuition. It makes it look more plausible.

Then choose the option that you believe is more representative of the big picture, regardless of the actual probability.

This effect has been observed in multiple studies, including studies involving participants with a good understanding of statistics, from students betting on the order of dice rolls to foreign policy professionals predicting the likelihood of a foreign policy crisis.

The conjunction fallacy is not only a problem in hypothetical situations.

Conspiracy theories and false news stories often rely on fallacy versions of the connection to appear believable. The more details you add that resonate with the outlandish story, the more plausible it starts to look.

Ultimately, however, the likelihood that a story is true is no greater than the probability that the least likely element of that story is true.

Juana Ramirez de Asbaje sat before a panel of authoritative theologians, jurists and mathematicians.

The Governor General of Nueva Spain invited them to test the young women's knowledge by asking them the most difficult questions they could gather.

But Juana has successfully answered every challenge, from complex equations to philosophical questions.

Observers later likened the scene to "a royal galleon dodging several canoes". The woman who received this interrogation was born in the mid-17th century.

At the time, Mexico had been a Spanish colony for over a century and had a complex, hierarchical class system.

Juana's maternal grandparents were born in Spain and were members of Mexico's most respected caste.

However, Juana was born out of wedlock, and her father, who was a captain in the Spanish army, left her mother, Doña Isabel, to raise Juana and her sisters alone.

Luckily, her grandfather had modest means, and the family was able to live comfortably.

And despite her illiteracy and misogyny of her time, Doña Isabel set a strong example for her daughters by successfully managing one of her father's two estates.

Perhaps this precedent inspired a lifelong confidence in Juana.

At the age of three, she snuck into her sister's school.

Later, when she learned that higher education was open to men only, she begged her mother to disguise herself and let her attend.

Her request was denied. Juana found solace in her grandfather's private library.

By early adolescence, she had mastered philosophical debate, Latin, and the Aztec Nahuatl language.

Juana's precocious intellect attracted the attention of the royal court in Mexico City, and when she was sixteen, the Viceroy and Queen took her in as a lady-in-waiting.

Here, her plays and poems alternately fascinated and infuriated the court.

Her provocative poem "Foolish Men" infamously criticized the double standard of sexism and how men corrupt women while denouncing their immorality.

Despite the controversy, her work still arouses adoration and numerous suggestions have been made.

But Juana was more interested in knowledge than marriage.

And there was only one place she could find it in the patriarchal society of the time.

The church allowed Juana to remain unmarried, to maintain her independence and respectability, while under the zealous influence of the Spanish Inquisition.

At the age of 20, she entered the Hieronymic Monastery of Santa Paula and assumed a new name, Sol Juana Inés de la Cruz.

Over the years, Sol Juana was considered a precious treasure of the Church.

In addition to sacred music and poetry, she also wrote dramas, comedies, and treatises on philosophy and mathematics.

She amassed a large library and was visited by many eminent scholars.

She acted as treasurer and custodian of the monastery, protecting her nieces and sisters from the men who sought to exploit them.

However, her outspokenness ultimately led to conflict with her benefactors.

In 1690, a bishop published Sol Juana's personal critique of the venerable sermon.

In that publication, he advised Sol Juana to devote himself to prayer rather than debate.

She replied that if God did not want women to use their intellect, they would not have given them intellect.

The exchange caught the attention of the conservative Archbishop of Mexico.

Slowly, Sol Juana was stripped of his fame, forced to sell his books and give up writing.

Enraged by this censorship, but reluctant to leave the church, she violently renewed her vows.

As her final act of defiance, she signed them in her own blood, "The Worst of Me."

Stripped of his scholarship, Sol Juana devoted himself to charity and died in 1695 of an illness he contracted while nursing his sister.

Today, Sol Juana is recognized as America's first feminist.

She has been the subject of countless documentaries, novels and operas, and even appears on the Mexican 200 peso banknote.

Nobel laureate Octavio Paz said: "It is not enough to say that Sol Juana's work is a product of history. I must add that history is also a product of her work."

The first question is why should we worry about the threat of a pandemic?

What are we worried about?

When I say "we," I'm on the Council on Foreign Relations.

We care about the national security community, and of course the biological and public health communities.

While globalization has increased travel, it has made it necessary for everyone to be anywhere in the world, at any time.

That means microbial hitchhikers are traveling with you.

As such, the plague outbreak in Surat, India has become not an obscure event, but a global event, a global concern that changes the risk equation.

Katrina taught us that we can't rely entirely on government to be prepared and able to handle things.

In fact, an outbreak can cause multiple Katrinas at once.

Our biggest concern at the moment is a virus called H5N1 flu (some people call it avian flu). The virus first appeared in southern China in the mid-1990s, but we didn't know about it until 1997.

As of late Christmas last year, only 13 countries had confirmed H5N1 infections.

However, up to 55 countries around the world now have the virus in birds, humans, or both.

Avian outbreaks show that almost the entire world, except the Americas, has witnessed the virus.

And I'll tell you in a moment why we've been saved so far.

In poultry, especially chickens, it is 100% lethal.

It is one of the deadliest strains of the world in recent centuries.

And we've dealt with this problem by killing a lot of chickens, but unfortunately there's often a cover-up going on and the tenant farmers aren't being compensated.

This is carried over to migratory patterns of wild migratory waterfowl.

This intensive event took place at a place called Chenghai Lake in China.

Two years ago, migratory birds experienced multiple incidents of virus mutations that killed thousands, dramatically expanding the range of the species.

So birds going to Siberia, Europe and Africa can carry the virus, which has never been possible before.

We are currently witnessing outbreaks in the human population, and fortunately so far there have been small events, small outbreaks and occasional clusters.

The virus has mutated dramatically over the last two years, forming two distinct families of the H5N1 viral tree, branching and with alarmingly different attributes.

So what does it have to do with us? First of all, historically, we have never been successful in producing a specific vaccine suitable for over 260 million people in a timely manner.

In a global pandemic, that's not very good for us.

You've probably heard about the vaccines we stockpile.

But no one believes it would actually be particularly effective in the event of an actual pandemic.

So the idea is that airports were closed after 9/11, delaying the flu epidemic by two weeks.

What we can think about is that we may be able to do what we need to do right now. We hear that H5N1 is spreading from person to person. The virus mutates and becomes a source of human-to-human transmission. Close the airport.

However, a large-scale supercomputer analysis of the potential for this effect has shown that this buys no time at all.

And of course that would wreak havoc on the preparation plan.

For example, all masks are made in China.

How will they mobilize from all over the world if all airports are closed?

How do we move vaccines around the world and how do we move therapeutics? Also, aside from whether a valid one is available.

Therefore, closing the airport proved counterproductive.

This virus worries us because, unlike other flus we've studied so far, it can be transmitted by eating raw meat from infected animals.

Wild cats, domestic cats, and even domestic dogs have been infected.

And when they experimentally fed rodents and ferrets, they found that the animals developed symptoms not seen in influenza, including seizures, central nervous system disturbances, and partial paralysis.

This is no ordinary garden flu.

It mimics what we now know about the reconstitution of the last pandemic influenza virus in 1918, in that it was transmitted directly from birds to humans.

We evolved over time to this incredible mortality rate in humans, 55 percent of those infected with H5N1 actually died.

And there are not so many people who have been infected but have not developed the disease.

When experimentally fed to monkeys, it indeed down-regulates certain immune system regulators.

As a result, it's not the virus that kills you directly, but your own immune system that overreacts and says, "Whatever this was, it was so foreign that I'm going berserk."

As a result, most of the deaths were healthy young people under the age of 30.

At least three clusters have confirmed human-to-human transmission, which fortunately involve very close contacts and still do not endanger the entire world of any kind.

Now, I'm nervous.

Now, you're probably thinking the government would do something.

And we've spent a lot of money.

Most of the Bush administration's spending was actually related to the anthrax outbreak and the threat of bioterrorism.

But a lot of money is being spent on infectious disease control at both the local and federal levels.

The end result: Only 15 states have been certified for mass distribution of vaccines and medicines during the pandemic.

Half the states will run out of hospital beds in the first week, maybe two.

And 40 states are already in dire nurse shortages.

Add in the threat of a pandemic and you're in big trouble.

So what did people do with this money?

Exercises and training are held all over the world.

Let's say a pandemic happened.

Let's all run around and do our part.

The main result was a huge amount of confusion.

Most of these people don't really know what their job will be.

And most importantly, what every exercise has made clear is that no one knows who is in charge.

No one knows the chain of command.

In Los Angeles, the mayor, the governor, the president of the United States, the secretary of homeland security?

In fact, the federal government says it's a man called the Chief Federal Officer who happens to be at the TSA.

The government says the federal government's responsibility is basically to stop the virus from getting in, which everyone knows is impossible, primarily to reduce its economic impact.

The rest is up to your local community.

It's all about your city, where you live.

Well, how many good city councils are there, and how many good mayors are there - that's who will be in charge.

Most of the local facilities will compete for a portion of the federal drug stockpile called Tamiflu. Tamiflu may or may not help - we'll get to that later - and will try to get all the available vaccines and other treatments, masks and other stockpiles.

And then there will be a lot of competition.

Well, we bought a vaccine made by Sanofi-Aventis. You've probably heard it too.

Unfortunately, it is based on H5N1 in its current form.

We know that viruses mutate. It's a different virus.

Vaccines probably won't help.

A decision must be made here.

You are the mayor of your local town.

Well, should we mandate that all pets be kept indoors?

Germany took this step to minimize family-to-house transmission from domestic cats and dogs when H5N1 emerged in Germany last year.

What if you don't have a ventilated containment room where healthcare workers can care for patients?

They are in Hong Kong. There is no such thing here.

What about quarantine?

Quarantine seems to have helped during the SARS epidemic in Beijing.

There is no unified policy on quarantine across the United States.

Also, some states have different policies for each county.

But what about the obvious? Should all schools be closed?

What about workers? If the kids aren't in school, they won't go to work.

Encourage working from home? what works?

Well, the UK government has implemented a work-from-home model.

For six weeks, everyone in the banking industry pretended a pandemic was underway.

What they discovered was core functionality. As you know, banks still existed, but they couldn't get people to put money into ATM machines.

No one was processing credit cards.

My insurance payment has not been completed.

And basically the economy will be in a dire situation.

It's just an office worker or a banker.

We don't know how important handwashing is for the flu. Shocking. It is considered good practice to wash your hands frequently.

In fact, however, there is a great deal of debate in the scientific community about what percentage of influenza infections among people are from sneezing and coughing and what percentage is on hands.

The Institute of Medicine tried to look into the masking problem.

Masks are no longer made in the USA, they are all made in China, so I know we won't have enough masks, so can we find a way? Do you need an N95? A state-of-the-art high-end mask that needs to fit snugly on your face?

Or can it be worked around by using several different kinds of masks?

In the SARS epidemic, Hong Kong found that most of the infections were caused by people improperly removing their masks.

And I got my hands dirty on the outside of the mask and ended up rubbing my nose. bingo! They got SARS.

It wasn't flying microbes.

If you go to the internet now, you will get a lot of false information.

You end up buying -- this is called an N95 mask. Ridiculous.

As a matter of fact, there are no standards for what protective clothing for first responders, those who are actually on the front lines, should be.

and Tamiflu. You've probably heard about this drug patented by Hoffmann-La Roche.

There are signs that it may buy time in the midst of an epidemic.

Suicidal thoughts are one of the side effects of taking Tamiflu for a long time.

A public health study, analyzing the impact of large-scale use of Tamiflu, shows that it is actually counter-productive to public health measures and making matters worse.

And here's another interesting point. When humans ingest Tamiflu, only 20 percent is properly metabolized to the active compound in the body.

The remainder transforms into stable compounds and survives filtration into water systems, thereby exposing them to potentially influenza-carrying waterfowl and giving resistant strains an opportunity to propagate.

And now, Tamiflu-resistant strains have been confirmed in both human-to-human transmission in Vietnam and human-to-human transmission in Egypt.

Therefore, I personally believe that Tamiflu as an effective drug has a very limited lifespan. In fact, it is very limited.

Nevertheless, most governments base their entire flu policy on Tamiflu stockpiles.

In fact, Russia stockpiles the equivalent of 95 percent of all Russians.

I have 30% stockpiled.

Two weeks is enough.

And since the pandemic lasts 18-24 months, you have to live with yourself.

Some of the poorer countries most experienced with H5N1 infections are stockpiling. They are already expired. They are already obsolete.

What do we know from 1918, the last great pandemic?

The federal government has abdicated most of its responsibilities.

The result was a messy patchwork of regulations across America.

Every city, county and state did their own thing.

And the rules and belief systems were very different.

In some cases, all schools, all churches and all public facilities were closed.

Pandemics have occurred three times in 18 months, despite the lack of commercial air travel.

The second wave was a mutated superkiller wave.

And in the first wave, there were enough medical workers.

However, by the time the second wave hit, the medical workers had suffered a great deal, losing most of the doctors and nurses who were working on the front lines.

Overall, 700,000 people lost their lives.

The virus was 100% lethal to pregnant women, but we really don't know why.

Most of the dead were between the ages of 15 and 40, robust and healthy young people.

It was likened to an epidemic.

I don't know how many people actually died.

A lower estimate is 35 million.

This is based on European and North American data.

A new study by Chris Murray of Harvard University shows that Indians had a 31-fold higher mortality rate when looking at a database kept by British people in India.

Therefore, there is a strong belief that the death toll was much higher in poorer areas.

And before commercial air travel is possible, the casualties are likely to range from 80 million to nearly 100 million.

So are you ready?

As a nation, no, we are not.

And I think even people in the leadership would say that's the case and that we still have a long way to go.

So what does that mean for you? First of all, I'm not going to start stockpiling anything personally for myself, my family, or my employees unless I've really done my homework.

Which masks work and which don't.

How many masks do you need?

A study at the Institute of Medicine felt that the masks were not recyclable.

Now, if you think this situation will last 18 months, are you going to buy 18 months worth of masks for your whole family?

I don't know, but it's the same with Tamiflu, but the biggest side effect of Tamiflu is flu-like symptoms.

So if everyone in your family is on Tamiflu, how can you tell who in your family has the flu?

Extending this to an entire community, or to all employees of a company, shows how limited Tamiflu options are.

Everyone comes to me and says stockpile water or stockpile food or what.

But really? Is there really a place to stockpile food for 18 months? 24 months of food?

Do you want to view the threat of a pandemic the same way people viewed civil defense issues in the 1950s and build your own little bunker for pandemic flu?

I don't think that is reasonable.

I think that we must prepare ourselves not as individuals, but as communities, as nations, as nations, and as towns.

And at this point, most of that preparation is seriously flawed.

I hope you agree with it. So the real job is to go out to local leaders and national leaders and say, "Why aren't we solving these problems?"

Why do we still think Katrina's lessons don't apply to the flu? ”

And put pressure where you need to put pressure.

But one more thing I should add is that if you have employees and you run a company, I think you have a certain amount of responsibility to show that you think ahead and plan for your employees.

At least the UK banking plans have shown that working from home can help.

Exposure will likely decrease as people no longer come into the office and cough on each other, touch common objects, or share things via their hands.

But can it keep the company alive?

If you have dotcom, you might be able to do that.

Otherwise you will be in trouble.

We look forward to hearing from you.

(Applause) Audience: What factors determine the duration of a pandemic?

Laurie Garrett: We don't really know what factors determine the duration of a pandemic.

We can deliver a lot of this and that and other flips.

But let's be honest, we don't know.

The obvious bottom line is that the virus will eventually weaken, cease to be deadly to humanity, and find another host.

But we don't really know how or why it happens.

It's a very complex ecology.

Audience: What triggers are you looking for?

You know much more than any of us.

Oh, if this happens, will there be a pandemic?

LG: The moment we found evidence of severe human-to-human transmission.

The infection spread in the community, spread within the school, within the dormitory, and was of such a nature, as well as close relationships between family members who cared for sick sisters and brothers.

And I think there is now a global consensus, across the WHO, to issue warnings.

AUDIENCE: Some studies have shown that statins may help.

can you talk about that?

LG: Right. There is some evidence that taking Lipitor and other common statins for cholesterol control may reduce vulnerability to the flu.

But I don't fully understand why.

The mechanism is not clear.

And I don't know if there's a way for someone to responsibly start medicating kids with a personal supply of Lipitor or something like that.

I have absolutely no idea what it does.

By doing so, you could be causing very dangerous consequences for your children.

AUDIENCE: How far along are we to be able to determine if someone is actually infected, if someone is infected, before symptoms become full-blown?

LG: Right. So I've been saying for a long time that what we really need is a quick diagnosis.

And our Center for Disease Control named the test they developed Rapid Diagnosis.

It takes 24 hours in a very highly developed laboratory and by highly skilled personnel.

I'm thinking of a dipstick.

You can do it with your own children. Color changes.

Find out if you are infected with H5N1.

In terms of where we stand in the scientific realm with regards to things like DNA discrimination, we're not too far off.

But we are not there. And no investment has yet been made to get there.

Audience: I understand there was a theory in the 1918 flu that the virus had some degree of attenuation when it entered humans.

Do you think there is a high chance of that happening here?

A mortality rate of 100% is pretty harsh.

LG: Right. So we don't really know how lethal the 1918 strain was to wild birds before it jumped from birds to humans.

It is strange that there is no evidence that chickens and domestic birds died in large numbers across the United States before the human pandemic occurred.

It may be because those events happened on the other side of the earth where no one pays attention.

However, the virus made its way around the world in an apparently gentle enough fashion that British forces during World War I actually proved that the virus was not a threat and would not affect the outcome of the war.

And after traveling around the world, it came back in a very deadly form.

What percentage of those infected died from it?

Again, I don't really know.

It is clear that if you were originally malnourished, had compromised immunity and lived in poverty in India or Africa, you were much more likely to die.

But I don't really know.

Audience: One of the things I've heard is that the real cause of death when you get the flu is associated pneumonia, and that a pneumonia vaccine could improve your chances of survival by 50%.

LG: Emerging disease researchers have long downplayed the threat of pandemic influenza because there were no antibiotics in 1918.

And most people who die from the common flu, about 360,000 people worldwide in a common flu year, most of them older people, don't die from the flu, they die because the flu attacks the immune system.

When pneumococcus or another bacterium, streptococcus or boom comes there, it causes bacterial pneumonia.

However, in 1918 it turned out that this was not the case at all.

And so far, bacterial infections have not been a problem at all in H5N1 infections in humans as well.

This completely staggering disruption of the immune system is the key to why people are dying from this virus.

And I should add that the same thing happened with SARS.

What's going on here is your body says yes and your immune system sends out all the guards and says, 'I don't know what the hell this is.

We have never seen anything like this in the slightest before. ”

Bringing in snipers won't do you any good, because there are no antibodies here.

Bringing in tanks and artillery will do you no good. Because T cells don't recognize it either.

Therefore, we need to drive the thermonuclear response across the board and stimulate the entire cytokine cascade.

The entire immune system gathers in the lungs.

And yes, they die from pneumonia by drowning in their own bodily fluids.

But it's not bacterial pneumonia.

And it's not vaccine-responsive pneumonia.

And I think my time is up. Thank you for your attention.

(applause)

I am sure all of you gathered here today have heard about how sustainable development can save us from ourselves.

But when we're not at TED, it's often said that real sustainability policy agendas are unattainable, especially in metropolitan areas like New York City.

That's because most people with decision-making power, both public and private, don't feel they're in danger.

Part of the reason I'm here today is because of my dog. An abandoned puppy I found in the rain in 1998.

Turned out she was a much bigger dog than I expected.

When she came into my life, we were battling a huge waste facility planned for the East River waterfront. Despite the fact that our small area of ​​New York City was already processing more than 40 percent of the city's total commercial waste. These include a sewage treatment pelletizing plant, a sewage sludge plant, four power plants, the world's largest food distribution center, and other industries that bring over 60,000 diesel trucks to the region each week.

The area also has one of the lowest ratios of parks to population in the city.

So when I was approached by the Parks Service about their $10,000 seed grant initiative to help develop waterfront projects, I thought they had really good intentions, but I was a little naive.

I've lived in the area all my life but never got to go to the river due to the many great facilities I mentioned earlier.

And then one morning while I was out jogging with my dog, she dragged me into an area she thought was just illegal dumping.

I won't write it here, but there were weeds, piles of garbage, and other things, but she kept dragging me. And lo and behold, there was a river at the end of the estate.

I knew this forgotten little street corner, neglected like a dog that brought me here, was worth saving.

And I knew it would be the proud beginning of a new community-driven revitalization of the South Bronx.

And just like my new dog, it was a bigger idea than I ever imagined.

We've garnered a lot of support along the way, and Hunt's Point Riverside Park is the first waterfront park in the South Bronx in over 60 years.

We've used that $10,000 seed grant over 300 times to build $3 million in parks.

And in autumn, I plan to exchange vows of marriage with my beloved.

(Audience whistles) Thank you.

(Applause.) That's him pushing my button there, which he does all the time.

(Laughter) (Applause) But those of us who live in the environmental justice community are the canaries in the coal mine.

We feel troubled now and for some time.

For those unfamiliar with the term environmental justice, environmental justice looks like this: No community should have the problem of having a greater environmental burden and less environmental benefits than others.

Unfortunately, race and class are very reliable indicators of where you'll find the good things like parks and trees, and the bad things like power plants and waste facilities.

As a black American, I am twice as likely as a white person to live in areas where air pollution poses the greatest risk to my health.

I am five times more likely to live within walking distance of a power plant or chemical facility, and I do.

These land-use decisions created a hostile environment that led to problems such as obesity, diabetes and asthma.

Why do people leave their homes for brisk walks in toxic neighborhoods?

Obesity rates are among the highest in the country at 27%, and are associated with diabetes.

One in four children in the South Bronx has asthma.

Hospitalization rates for asthma are seven times the national average.

These influences affect everyone.

And we are all paying big bucks for the cost of solid waste, the health problems that come with pollution, and, even more abhorrently, the cost of imprisoning young Black and Latino men with immense untapped potential.

Fifty percent of the population lives below the poverty line. 25 percent of us are unemployed.

Low-income citizens often use emergency departments as their primary care.

Not only does this result in high costs for taxpayers, but it also does not generate commensurate returns.

Not only are the poor still poor, they are still unhealthy.

Luckily, there are many people like me striving for solutions that won't cost the lives of low-income communities of color in the short term, or doom us all in the long term.

None of us want that, and it's common to all of us.

So what else do we have in common?

First of all, we are all incredibly good looking.

(Laughter) High school, college, graduate school, traveled to interesting places, no kids in early teens, financially stable, never been incarcerated.

OK. good.

(Laughter.) But besides being a black woman, I'm different from most of you in a few other ways.

I witnessed almost half of the buildings in my neighborhood burn down.

My brother Lenny fought in Vietnam and was shot a few blocks from home.

Jesus.

I grew up in a cracked house across the street.

Yes, I'm a poor black kid from the ghetto.

These things make me different from you.

But what we have in common is what sets me apart from most people in my community, and that I am between these two worlds and have enough heart to fight for justice in the other world.

So how did our situation change so much?

In the late 40s, the son of a Pullman porter and slave, his father bought a house in the Huntspoint neighborhood of the South Bronx and married his mother a few years later.

At the time, the community was a mostly white, working-class neighborhood.

Father was not alone.

And as people like him pursue their own American Dream, White Flight has become commonplace in the South Bronx and in many cities around the country.

Redlining was used by banks, where certain areas of the city, including our district, were prohibited from investing of any kind.

Many landlords believed it would be more profitable to set the building on fire and collect the insurance money than to sell it on such terms, even though former tenants died or were injured.

Hunts Point used to be a walkable community, but now residents have no jobs or homes within walking distance.

The highway construction rush also added to our problem.

In New York, Robert Moses spearheaded an aggressive highway widening campaign.

One of its main goals was to make Manhattan easier for residents of wealthy communities in Westchester County.

The South Bronx in between had no chance.

It often took less than a month for residents to receive notice before a building was demolished.

600,000 people were evacuated.

The general perception was that only prostitutes and prostitutes came from the South Bronx.

And if you were told from an early age that nothing good comes from your community and that it is bad and ugly, why not reflect on it?

So now my family's property was worthless, except for the house and everything we had.

And luckily for me, that home and the love in it, and the help from my teachers, mentors, and friends along the way was enough.

So why is this story important?

Because from a planning perspective, economic deterioration causes environmental deterioration, which in turn causes social deterioration.

The deprivation of investment that began in the 1960s set the stage for all the environmental injustice that followed.

Outdated zoning and land use regulations are still used to keep polluting facilities in my neighborhood.

Are these factors considered when determining land use policies?

What are the costs of these decisions?

and who will pay? who benefits?

Is there any justification for what the local community is experiencing?

This was a quoted "plan" and did not have our best interests in mind.

When we realized that, we decided it was time to make our own plans.

That little park we talked about earlier was the first step in building the Greenway movement in the South Bronx.

I wrote a $1.5 million federal transportation grant to plan a waterfront boardwalk with bike paths on dedicated roads.

Physical improvements can help inform public policy regarding road safety, the placement of waste and other facilities, and, when properly implemented, do not compromise the quality of life of local communities.

These offer opportunities for local economic development as well as being more physically active.

Think of a bike shop or a juice stand.

We have secured $20 million to build the first phase project.

This is Lafayette Street. Redesigned by Matthews Nielsen Landscape Architects.

And when the trail is built, it will connect the South Bronx to more than 400 acres of Randall's Island Park.

Right now we are about 25 feet deep in the water, but this link changes things.

As we nurture our natural environment, its richness brings us even more.

We run a project called Bronx [Environmental] Stewardship Training. It provides vocational training in the field of ecological restoration so that local people can acquire the skills for these high-paying jobs.

Little by little, we are seeding the region with green collar jobs and people who have a financial and personal stake in their environment.

The Sheridan Expressway is an underutilized relic of the Robert Moses era, built without regard for the neighborhoods it divided.

There are almost no people even at rush hour.

The community has created an alternative transportation plan that allows for the removal of the highway.

We now have the opportunity to bring all stakeholders together to reimagine how these 28 acres can be put to good use for parks, affordable housing and local economic development.

We also built New York City's first green and cool roof demonstration project over our office.

A cool roof is a highly reflective surface that does not absorb solar heat but transfers it into the building and into the atmosphere.

Green roofs are soil and living plants.

Both can replace petroleum-based roofing materials that absorb heat, contribute to the urban “heat island” effect, and degrade in the sun we breathe in.

Green roofs also retain up to 75 percent of rainfall, reducing the need for cities to fund expensive end-of-pipe solutions. By the way, these solutions are often installed in environmental justice communities like mine.

And they provide habitat for our little friends.

[Butterfly] (laughs) It's so cool!

Either way, this demonstration project will be the starting point for our own green roof installation business, bringing jobs and sustainable economic activity to the South Bronx.

[Green is the new black...] (Laughter) (Applause) I like that too.

Anyway, I know Chris told us not to pitch in here, but we need investors because it's getting everyone's attention. end of the pitch.

It is better to ask for forgiveness than to ask for permission.

Anyway -- (laughter) (applause) OK. Katrina.

Before Katrina, the South Bronx and New Orleans' 9th Ward had a lot in common.

Both were home to many poor people of color, and both were hotbeds of cultural innovation. Think hip hop and jazz.

Both are waterfront communities, with industries and residents in close proximity to each other.

In the post-Katrina era, we have even more in common.

At best we are ignored, at worst we are vilified and abused by negligent regulators, bad zoning and lax government accountability.

Destruction was inevitable in the Ninth Ward and the South Bronx.

But we were able to learn a valuable lesson on how to dig ourselves.

We are not merely a national symbol of urban devastation or a problem to be solved by a president's empty campaign promises.

Now, like the South Bronx, leave the Gulf Coast alone for 10 or 20 years?

Or will we take proactive steps and learn from the homegrown resources of grassroots activists born out of community desperation like mine?

Now listen, I don't expect individuals, corporations, and governments to make the world a better place because they are righteous and moral.

This presentation today is just part of what I've been through.

Like little things. I have no clue.

But if you want to know, I'll tell you later.

(Laughter) But I know it's the underlying thing, or the individual's perception of it, that ultimately drives people.

I am interested in what I call the 'triple bottom line' that sustainable development can create.

Developments that have the potential to positively benefit all parties involved, including developers, governments, and the communities in which the projects are implemented.

At this time, nothing like that is happening in New York City.

And it is operated with a comprehensive urban planning deficit.

While the government-funded parade will propose large-scale facility and stadium developments in the South Bronx, there has been little coordination among city officials on how to address the cumulative impacts of increased traffic, pollution, solid waste, and impacts on the plaza.

And their approach to local economic and employment development is so bad it's not even funny.

Because, on top of that, the richest sports team in the world is looking to demolish two popular community parks to replace the house Ruth built.

Well, even less than the stats we talked about earlier.

And while less than 25 percent of South Bronx residents own a car, these projects include thousands of new parking spaces and easy access to public transportation.

Now, what is missing from the larger debate is a comprehensive cost-benefit analysis between not fixing unhealthy and environmentally challenged communities and incorporating structural and sustainable change.

My agency works closely with Columbia University and others to shed light on these issues.

Just to be clear here, I'm not against development.

Ours is a city, not a nature reserve.

And I accepted the capitalist in me.

And I don't have -- (Laughter) you probably have, and if you don't, you should.

(Laughter) So I have no problem with developers making money.

There is ample precedent to show that sustainable and community-friendly development can still create wealth.

Fellow TEDsters Bill McDonough and Amory Robbins, who are both my heroes by the way, have shown us that it can actually be done.

I have a problem with developments that over-exploit politically vulnerable communities for profit.

It is a shame for all of us that it continues. Because we are all responsible for the future we create.

But one of the things I do to remind myself of the greater possibilities is learning from visionaries in other cities.

Here is my version of globalization.

Let's take a look at Bogota.

A poor Latino surrounded by gun violence and drug trafficking. It doesn't resemble the reputation of the South Bronx.

However, the city enjoyed the birth of a very influential mayor in the late 1990s, Enrique Peñalosa.

He turned to demographics.

Few people in Bogotano own a car, but most of the city's resources were devoted to car servicing.

The mayor will do something about it.

His administration narrowed the city's main thoroughfare from five to three lanes, prohibited parking on its streets, expanded sidewalks and bike lanes, created public squares, and created one of the most efficient bus mass transit systems in the world.

For his brilliant efforts, he was nearly impeached.

But when I began to realize that people were prioritizing issues that reflected their daily lives, something incredible happened.

People stopped littering.

Crime rates have decreased because the streets are more crowded.

His administration attacked several classic urban problems at once, and with Third World budgets.

There are no excuses in this country, sorry.

But the bottom line is that their people-first policy was not meant to punish those who could actually afford a car, but rather to provide an opportunity for all Bogotano residents to participate in the city's revitalization.

The idea that development should not come at the expense of the majority of the population is still considered radical here in the United States.

But Bogota's example has the power to change that.

But you are endowed with the gift of influence.

That's why you're here to appreciate the information we exchange.

Use your influence to support inclusive and sustainable change everywhere.

Don't just talk about it at TED.

This is a national policy agenda that I am trying to build, and as you all know, politics is personal.

Help make green the new black.

Help make sustainability sexy.

Make it part of the dinner or cocktail conversation.

Help me fight for environmental and economic justice.

Support your investment with triple bottom line returns.

Get everyone at the table and help democratize sustainability by claiming that comprehensive planning works everywhere.

Oh how I wish I had more time!

please listen. When I spoke with Mr. Gore after breakfast the other day, I asked him how he would include environmental justice activists in his new marketing strategy.

His answer was a grant program.

I don't think he understood that I wasn't asking for funding.

I made him an offer.

(Applause) What bothers me is that this top-down approach still exists.

Now, don't get me wrong, we need money.

(Laughter) But you need a grassroots group at the table in the decision-making process.

Gore reminded us that 90 percent of our energy is what we waste every day, but don't add the waste of energy, intelligence and hard-earned experience to that number.

(Applause) I have come all the way here to meet you.

don't waste me

By working together, we can be one of a small, rapidly growing group of people who have the audacity and courage to believe that we can actually change the world.

We may have come to this conference from very different places in life, but believe us, we all share one incredibly powerful thing.

We have nothing to lose and all to gain.

Hello beauties!

(applause)

At TED last year, I introduced the LHC.

And I promised to come back and give an update on how the machine performed.

That's all. And for those who weren't there, the LHC is the largest science experiment ever attempted, with a circumference of 27 kilometers.

Its job is to reproduce, up to 600 million times per second, the conditions that existed within a billionth of a second since the universe began.

It's nothing if it's not ambitious.

This is a machine under Geneva.

We take pictures of the mini-Big Bang inside the detector.

This is a piece I'm working on. It is called the ATLAS detector and is 44 meters wide and 22 meters in diameter.

A spectacular photo of ATLAS under construction. You can see the size of the scale.

I turned on the machine for the first time on September 10th of last year.

And this photo was taken by ATLAS.

It caused an uproar in the control room.

Here's a picture of the first beam particles circling around the LHC, intentionally colliding with part of the LHC, and the particles raining down on the detector.

In other words, when we saw the picture on September 10th, we knew the machine worked. This is a big win.

I don't know if this got the loudest cheers, or when someone went to Google and saw that the front page was like that, this got the loudest cheers.

It means that we have not only had a scientific impact, but also a cultural impact.

About a week later, I had a problem with my machine. This was actually related to the piece of wire that is here, the gold wire.

These wires carry 13,000 amps when the machine is running at full power.

Now, the engineers among you will look at them and say, "No, they're not. They're little wires."

This is possible because when it cools down very much, it becomes a so-called superconducting wire.

So at minus 271 degrees, which is colder than interstellar, the wire can carry that current.

There was a manufacturing defect in one of the joints between over 9,000 magnets in the LHC.

So the wire was slightly heated and its 13,000 amps suddenly encountered electrical resistance.

This was the result.

That's even more impressive considering that these magnets weighed over 20 tons and traveled about a foot.

So I damaged about 50 magnets.

We had to get them out and we did.

We retuned and fixed them all.

They are now on their way back underground.

By the end of March, the LHC will be intact again.

We'll turn on the switch and get data in June or July to continue our quest to figure out what the universe is made of.

In some ways, of course, these accidents have rekindled the debate about the value of cutting-edge science and engineering. It's easy to argue.

I think the fact that it's so difficult, the fact that we've gone too far, is the value of something like the LHC.

I would like to give the last words to the British scientist Humphrey Davey, who supposedly said this in defense of his protégé—his protégé was Michael Faraday—in vain. “There is nothing more dangerous to the progress of the human mind than to assume that our view of science is ultimate, that nature is devoid of mysteries, that our victories are complete, and that there are no new worlds to conquer.”

thank you.

(applause)

We look around the media like we look at the news of Iraq, Afghanistan, Sierra Leone, and this conflict seems incomprehensible to us.

And it certainly seemed to me when I started this project.

But as a physicist, I thought I might be able to figure this out if you could give me the data. You know, try it.

So, as a naive New Zealander, I thought I'd go to the Pentagon.

Can you give me some information?

(Laughter) No, so I had to think a little harder.

And one night I was watching the news in Oxford.

And I looked down at the people chatting on the channel of my choice.

Then I realized that the information was there.

Data was in the stream of news we consumed.

This noise around us actually contains information.

So I started thinking, maybe there's some sort of open source intelligence here.

If you can collect enough of these streams of information, perhaps you can begin to understand warfare.

This is exactly what I did. We started forming interdisciplinary teams of scientists, economists and mathematicians.

We got these people together and started trying to solve this problem.

I did it in 3 steps.

The first step we took was collection. We looked at 130 different sources, from NGO reports to newspapers and cable news.

We ingested and filtered this raw data.

I extracted the important bits of information to build the database.

Its database included the timing, location, scale and weapons used of attacks.

It's all in the flow of information we consume every day and all we need is to know how to tap into it.

Once you have this, you can start doing great things.

What if we looked at the distribution of attack sizes?

What does it tell us?

So we started this. The horizontal axis here shows the number of people killed in the attack, or the scale of the attack.

The vertical axis shows the number of attacks.

So let's plot some sample data on this.

We see some sort of random distribution. Perhaps 67 attacks resulted in 1 death, or 47 attacks resulted in 7 deaths.

We did the exact same thing with Iraq.

And for Iraq, we never knew what we would find.

What we found was pretty amazing.

If we take out all the conflict, all the confusion, all the noise, then we have the exact mathematical distribution of the order of attacks in this conflict.

We were shocked by this.

Why should this be a fundamental feature in a conflict like Iraq?

Why does war need order?

We didn't really understand it.

We thought Iraq had something special.

So I looked at some more conflicts.

We saw Colombia, Afghanistan and Senegal.

And the same pattern emerged in each conflict.

This shouldn't have happened.

These are different wars with different religious factions, different political factions and different socio-economic problems.

Yet the basic pattern underlying them is the same.

So I went a little wider.

We looked at all the data available worldwide.

From Peru to Indonesia, we studied the same pattern again.

And we find that not only are the distributions these straight lines, but the slopes of these lines are clustered around this alpha value equal to 2.5.

And we were able to generate an equation that could predict the likelihood of an attack.

What we're saying here is that the probability that an attack in a country like Iraq will kill X people is equal to the scale of the attack to the negative power of alpha.

Negative alpha is the slope of the line shown earlier.

so what?

This is data, statistics. What does it tell us about these conflicts?

That was the challenge we had to face as physicists.

How do we explain this?

And what we actually discovered was that, come to think of it, Alpha is the organizational structure of the Rebellion.

Alpha is the distribution of the magnitude of attacks, which is actually the distribution of the strength of the group carrying out the attacks.

We therefore focus on the processes of group dynamics: coalescence and fragmentation, group bonding, and group splitting.

And start working out the numbers on this one. Why not try a simulation?

Can we create patterns like those seen in places like Iraq?

Turns out we did a decent job after all.

You can run these simulations.

We can use the process of group dynamics to replicate this and explain the patterns we see in conflicts around the world.

what happened?

Why should these different, seemingly different conflicts have the same pattern?

Now what I believe is that the rebels have evolved over time. they adapt.

And it turns out that there is only one solution - to fight a much stronger enemy.

And if you don't find that solution as an insurgent, you don't exist.

So all ongoing rebels, all ongoing conflicts, are:

And that's what we think.

How do you move it forward and change it?

How do we end a war like Iraq?

what does it look like?

Alpha is structure. Stable at 2.5.

This is what happens when war continues.

you have to change that.

we can push it up. Power is further subdivided. There are more of them, but they are weak.

Or push it down. they are more robust. small group. But you may be able to sit down and talk to them.

I'm going to show you this graph now.

No one has seen it before. This is literally what we went through last week.

And watch the alpha evolve over time.

You can see it start. And we are watching it grow to a state of stability similar to wars around the world.

And it remained there from the invasion of Fallujah to the Samara bombings during the 2006 Iraqi elections.

And the system gets confused. Move upwards to the fragmented state.

A surge occurs at this time.

And depending on who you ask, this surge should have pushed prices even higher.

The opposite happened.

The group became even stronger.

they have become more robust.

So I think, yeah, great, it's going to keep going down.

we can talk to them you can get the solution. The opposite happened.

It's going up again. Groups are further subdivided.

And this will tell you one of two things.

Either we're back where we started, or we didn't have the impact of the surge. Or eventually the group will split up and we can start thinking about moving.

I don't know the answer to that.

But we know that answering that question requires looking at the structure of the rebellion.

thank you.

(applause)

Maize now accounts for more than one-tenth of the world's crop production.

The United States alone has enough cornfields to cover Germany.

However, while there are many different varieties of other crops that we grow, over 99% of the corn we grow is the exact same variety, Yellow Dent #2.

This means that humans grow more Yellow Dent #2 than any other plant on Earth.

So how did this single plant, single variety become the greatest agricultural success story in history?

About 9,000 years ago, maize, also called maize, was first domesticated from teosinte, a grass native to Mesoamerica.

The stony seeds of teosinte were hardly edible, but their fibrous shells could be turned into a versatile ingredient.

Over the next 4,700 years, farmers bred this plant into a staple crop with larger cobs and edible grains.

As corn spread across the Americas, corn played an important role, with multiple indigenous societies worshiping the "mother of corn" as the goddess who created agriculture.

When Europeans first arrived in America, they avoided this strange plant.

Many even believed it was responsible for the physical and cultural differences between them and Mesoamericans.

However, attempts to grow European crops on American soil soon failed, forcing the settlers to expand their diets.

Once they found a crop to their liking, maize quickly crossed the Atlantic and became a popular crop in many European countries because it can grow in a variety of climates.

But the newly founded United States was still the corn capital of the world.

In the early 1800s, different regions of the country produced varieties of different sizes and flavors.

By the 1850s, however, these unique breeds proved difficult to package for railroad companies and difficult to sell for traders.

Trade commissions in railroad hubs such as Chicago encouraged corn farmers to breed a single, standardized crop.

This dream finally came true at the 1893 World's Fair, when James Reid's Yellow Dent Cone won the Blue Ribbon Award.

For the next 50 years, yellow dent corn dominated the United States.

With the technological development of World War II, mechanized harvesters became widespread.

This means that a batch of corn that previously took a full day to manually harvest can now be collected in just five minutes.

Another wartime technology, the chemically explosive ammonium nitrate, was also given new life on the farm.

This new synthetic fertilizer allows farmers to plant dense corn fields each year without rotating crops or restoring nitrogen to the soil.

These advances made corn an attractive crop for American farmers, but U.S. agricultural policy limited the amount farmers could grow to ensure a high selling price.

However, in 1972, President Richard Nixon lifted these restrictions during negotiations for a large grain sale to the Soviet Union.

With this new trade agreement and World War II technology, corn production exploded into a global phenomenon.

These mountains of corn have inspired numerous corn concoctions.

Cornstarch can be used as a thickener in everything from gasoline to glues, or processed into a low-cost sweetener known as high fructose corn syrup.

Corn quickly became one of the cheapest animal feeds in the world.

This allowed for cheaper meat production and increased demand for meat and corn feed.

Humans currently eat only 40% of all corn grown, while the remaining 60% supports the consumer goods industry worldwide.

But the spread of this marvelous crop came at a price.

The world's water sources are polluted by excess ammonium nitrate from cornfields.

Corn accounts for the majority of agriculture-related carbon emissions, partly because it enables increased meat production.

High fructose corn syrup use may contribute to diabetes and obesity.

And with the rise of monoculture agriculture making our food supply dangerously vulnerable to pests and pathogens, a single virus could infect the global supply of this ubiquitous crop.

Corn has gone from being a luxuriant grass to being an integral part of the world's industries.

But time will tell if it has led us down an unsustainable maze.

What I want to do today is take some time to talk about something that has been giving me a bit of existential angst over the last few years. I can't find better words.

And basically these three quotes tell what's going on.

"When God made the color purple, God was just showing off," writes Alice Walker in The Color Purple.

And Zora Neale Hurston, in Dust Trails on the Road, writes, "Research is curiosity formalized.

It is poking and prying with purpose. ”

And finally, when we think about the near future, we adopt a “whatever happens, it will happen” attitude.

right?

So this is consistent with the Cheshire Cat's saying, "It doesn't really matter which way you go if you're not really interested in where you want to go."

But I think it matters which direction we go and what path we take. Because I think that when thinking about design in the near future, the most important issue, the really important and essential thing, is the need to revitalize art and science now in 2002.

(Applause.) If we describe the near future as 10, 20, 15 years from now, it means that what we are doing today will be very important. Because in 2015, 2020, 2025, the world that our society will be built upon is exactly the same as the basic knowledge and abstract ideas, the discoveries we come up with today, and all these wonderful things we hear here at the TED conference that we take for granted in the world today. , was actually knowledge and ideas born in the 50's, 60's and 70's.

That is the substrate we are using today.

The internet, genetic engineering, laser scanners, guided missiles, fiber optics, high-definition television, remote sensing from space, and amazing remote sensing photography with 3D weaving, TV shows like Tracker and Enterprise, CD-rewritable drives, flat screens, Alvin Ailey's "Sweet Otis" and Sarah Jones' "Your revolution [won't happen] between these thighs" (which is prohibited by US law, by the way). FCC or ska -- all of these are, no doubt, almost without exception, actually based on ideas, abstractions, and creativity from years ago.

So we have to ask ourselves. What are we contributing to that legacy now?

And thinking about it really worries me.

Frankly, I'm worried.

I am skeptical that we are doing anything.

In a way, we are failing to act towards the future.

We are intentionally and consciously lagging behind.

we are lagging behind

"Each generation must discover its mission in relative obscurity and either follow it or betray it," said Franz Fanon, a psychiatrist from Martinique.

what is our mission? What do you have to do?

I believe our mission is to reconcile and reunite science and art. Because there is a division in popular culture right now.

People have this idea that science and art are actually separate things. We consider them separate.

And although this idea was probably introduced centuries ago, it's really becoming important now. Because we continue to think that art is separate from science, that it's cute to say, 'I don't understand anything about this, I don't understand anything about the other,' and we make decisions about society every day, and then we're going to cause problems.

Now, I don't think anyone here at TED thinks so.

We all already know they are very connected.

But let me tell you that there are people in the outside world who, believe it or not, think it's pretty cool to say that "scientists and science aren't creative."

Perhaps scientists are original, but not creative. ”

And we have this tendency, career counselors and various people say: "Artists are not analytical.

They are probably original, but not analytical. ”

And when these concepts underlie our teachings and our thinking about the world, we get in trouble because they prevent us from supporting anything.

By embracing this dichotomy, joke or not, as we try to adapt it to our world and build the foundations of it, we are ruining our future.

Who would want something illogical?

If we said we had to choose one or the other, talent would flow out of one of these areas.

And they go where they think, "You can be creative, yet be logical."

Okay, I grew up in the 60's and will admit it. In fact, my childhood spanned the 60's and I wanted to be a hippie, but I was always resentful of the fact that I wasn't old enough to be a hippie.

And I know there's a younger generation here who wants to be a hippie.

And they talk about the anarchy that was there.

But when I think about the 60s, what I got from it was that there was hope for the future.

I thought anyone could participate.

Great and incredible ideas have always permeated, and a lot of the cool stuff and hot stuff today is actually based on some of those concepts, whether it's people trying to use Star Trek's main directives or getting involved in things, or those 3D fabrics and fax machines you've read about in your weekly readers about technology and engineering just getting started.

But the 60's left me with a problem.

You know, I was following all this and I always thought I would go to space.

As you know, when I was young and a teenager, I loved designing and making clothes for dolls and wanted to be a fashion designer.

I took art and ceramics.

I loved dancing: Laura Falana, Alvin Ailey, Jerome Robbins.

And I also worked hard on the Gemini and Apollo programs.

I had a lot of science projects and astronomy books.

I studied calculus and philosophy.

I wondered about infinity and the big bang theory.

And when I was at Stanford, I was a senior in chemical engineering, and half the people thought I was majoring in political science and performing arts. It was true in a way. Because I was president of the Black Students Union and I majored in other things.

And in the final quarter, I juggled chemical engineering segregation processes, logic classes, nuclear magnetic resonance spectroscopy, and even creating and choreographing dance pieces.

And since I had to work in lighting and design, I was trying to think: Should I go to New York City to become a professional dancer, or should I go to medical school?

Well my mother helped me figure it out.

(Laughter.) But when I went to space, I took a lot of stuff with me.

I had a poster of Alvin Ailey. You see, I love dance companies. Alvin Ailey poster featuring Judith Jamison performing the dance "Cry" dedicated to all black women in the world. Bundu statue from the Women's Association of Sierra Leone. A certificate for Chicago Public Schools students working to advance their science and mathematics.

And people asked me, "Why did you pick up what you picked up?"

And I couldn't help but say, "Because it represents human creativity. The creativity that gave us the need to conceive, build and launch the Space Shuttle springs from the same source as the imagination and analysis required to carve Bundu, or the ingenuity required to design, choreograph and stage Cry."

Each of them is a different manifestation, incarnation of creativity - incarnation of human creativity.

And that's what we have to reconcile in our minds and how these things fit together.

The difference between art and science is not analytical or intuitive.

right?

E = mc2 required an intuitive leap, followed by analysis.

In fact, Einstein said, "The most beautiful things we can experience are the mystical.

In dance, we need and want to express the ecstasy of life, but we have to think about exactly what movements to do to convey it correctly.

The difference between art and science is not constructive or deconstructive either.

Many people see science as deconstructive and as having to take things apart.

Yes, particle physics is deconstructive. Literally tear apart atoms and try to figure out what's inside.

But the sculpture is deconstructive, as I have heard from great sculptors. Because you look at the work and remove what you don't need to be there.

Biotechnology is constructive.

Orchestral arrangements are constructive.

So, in fact, we use constructive and deconstructive techniques in everything.

The difference between science and art is not that they are different aspects of the same coin, different parts of the same continuum, but rather manifestations of the same thing.

Different quantum states of atoms?

Or, if you want to be more 21st-century, you could say that they are different harmonic resonances of superstrings.

But leave it at that.

They spring from the same source.

Art and science are the embodiment of human creativity.

It is an attempt by us humans to better understand the universe, the world around us.

It is our attempt to influence things inside and outside of us, the universe.

For me, science is an attempt to express and share our understandings and experiences to influence the universe outside of us.

It doesn't depend on us individually.

It is the universe that everyone experiences.

Art expresses our aspirations, our attempts to share and influence others through our unique experiences.

Let me say it again in another way. Science provides a universal understanding of experience, and art provides a universal understanding of individual experience.

That's what we have to think, they're all part of us, they're all part of a continuum.

It's not just a tool, it's not just science, mathematics, numerical things, statistics. Because I heard people talking on this stage that music is mathematical.

Art doesn't just use clay, it's not the only one that uses clay, light, sound and movement.

They also use analytics.

So people might say, "Well, I still like intuitive and analytical stuff." Because everyone wants to do right-brain and left-brain things.

We've all been accused of being right-brained or left-brained at some point, depending on who we disagree with.

(Laughter.) You know, people say 'intuitive' and it's kind of in touch with nature, in touch with yourself and your relationships. You are analytical and use your head.

Let me tell you a little secret. I'm sure you all know.

But sometimes people use the analytic idea that things are outside of us and say that this is what we are trying to elevate as the true and most important science, right?

Then there are the artists. As we all know, artists say something about scientists. Because scientists say they are too specific and disconnected from the world.

But it happened on stage too, so don't pretend you don't know what I'm talking about.

(Laughter) We had people talking about the Flat Earth Society and flower arrangements. So there's this whole dichotomy that we keep having even though we know all too well.

And people say you have to choose one or the other.

But choosing between intuitive and analytical is really stupid.

It's a stupid choice.

It's as stupid as trying to choose between the realistic and the ideal.

You need both in your life.

Why do people do this?

Quoting 70-year-old molecular biologist Sydney Brenner: he can say:

"It is always important to distinguish between chastity and impotence," he said.

Now -- (laughter) I'd like to share a little equation, okay?

How does understanding science and art fit into our lives, and what is going on at design conferences and what are we discussing?

And this is a tidbit I came up with. Understanding and our resources and our will will bring us results.

Our understanding is science, art and religion. how we see the universe around us Our resources, our money, our labor, our minerals, the things that exist in the world we have to work with.

But more important is our will.

This is our vision, our aspirations for the future, our hopes, our dreams, our struggles and our fears.

Our successes and failures influence our actions in all of them.

And to me, design and engineering, craftsmanship and a skilled workforce are all things that we work to deliver outcomes that are the quality of our human lives.

where do we want the world to be?

And what do you think?

Regardless of how you look at this, whether you look at art and science separately or separately, both are affected now, both have problems.

I did a project called "S.E.E.ing the Future: Science, Engineering and Education".

We were looking at ways to identify the most effective use of government funds.

We have many scientists at all stages of their careers.

They came to Dartmouth College where I taught.

And they discussed with theologians and financiers: What are the public funding issues for science and engineering research?

What's the most important thing about it?

Several ideas have arisen that seem to have very strong parallels with art.

They first said that the situation in which we are today in the fields of science and engineering that made us world leaders is very different from what we were in the 40's, 50's, 60's and 70's, when we were world leaders, because we are no longer competing with fascism and Soviet-style communism.

By the way, the competition was not just military. It also included social and political competition that allowed us to see space as one of the platforms for proving the superiority of our social system.

Another thing they talked about was that the infrastructure supporting science was aging.

Looking at universities, junior colleges, and small and medium-sized community colleges across the country, laboratories are becoming obsolete.

And it's where most of the scientific workers, researchers, and, incidentally, teachers are trained.

And there are media that do not support the dissemination of more than the most banal and stupid information.

Pseudoscience, crop circles, alien dissections, haunted houses, disasters, and more.

And that's what we're seeing.

This is not the information you need to understand how to actually operate in your daily life, participate in this democracy, and judge what is going on.

He also said that the mindset of companies is changing.

Government funding has always been in basic science and engineering research, but we expected some companies to do basic research as well.

But what is happening now is that companies are putting more energy into short-term product development than into basic engineering and scientific research.

And education has not caught up.

From K to 12 people are taking out wet labs.

They think having a computer in the room will replace the actual work of mixing acid and growing potatoes.

And it's not true when you say let companies take over when government spending is going down.

Government funding should at least address things such as recognizing the cost-benefits of basic science and engineering research.

We must be aware of our responsibilities as global citizens in this world.

We must look to human education.

We now need to build resources and train them to understand the importance of these.

And we must support the vitality of science.

It doesn't mean that one thing has to happen to everything, or that you know exactly what will happen as a result, but that it supports the energy and intellectual curiosity [that accompanies it].

And considering the similarities with these arts, competition from the Bolshoi Ballet spurred the rise of the Joffrey Ballet and the New York City Ballet.

Across the country, infrastructure, museums, theaters and cinemas are disappearing.

More TV stations are watching less and more money is being spent on rewriting old TV shows to make them into movies.

We are now corporate funded and when we support art it is almost mandatory that the product is part of the artist's painting.

There are stadiums named many times by companies.

In Houston, we're trying to figure out what to do with the Enron Stadium stuff.

(Laughter) Art and education in schools is disappearing, and we have governments that seem to gut the NEA and other programs.

So we really have to stop and think: what are we going to do with science and art?

I need to activate them.

we need to pay attention to it.

I'd like to tell you briefly what I'm doing -- (Applause) I'd like to tell you what I've been doing for a little while since then...

I feel this will require synthesizing some of the ideas I've thought about and encountered over time.

One thing I've noticed is that the dichotomy between mind and body also needs to be repaired.

My mother always told me that I had to be observant and know what was going on inside my mind and body.

And as a dancer, I had tremendous faith in my ability to know my body, just as I know my sense of color.

Then I went to medical school, and I was supposed to do exactly what the machine said about the body.

When you ask a patient a question, some people say, "Don't listen to what the patient says."

We know that patients know and understand their bodies better, but these days we try to disconnect them from that idea.

We have to reconcile what patients know about their bodies with what doctors measure.

I had someone talk about measuring our emotions and making machines understand what we can do to keep us from acting insane.

No, it should not be measured.

Machines should not be used to measure road rampage and take any steps to avoid being caught in it.

Perhaps machines can help us recognize when we are road raging. After that I need to know how to control it without a machine.

We need to be able to recognize it even without a machine.

What I am very concerned about is how do we reinforce our self-awareness as humans and as organisms?

Michael Moshen said we must teach and learn how to feel with our eyes and see with our hands.

We have all sorts of possibilities for using our senses and that's what we have to do.

that's what i want to do. It's about trying to use biometrics and stuff like that to help us get a sense of what we're doing.

That's what I'm doing now as a company called BioSentient Corporation.

I thought I would have to do that ad. Because I'm an entrepreneur, and by "entrepreneur" I mean someone who's doing what they want because they're not broke enough to have to find a real job."

(Laughter) But that's what I'm working on here at BioSentient Corporation, trying to figure out how to bring these things together.

Finally, let me finish by saying that my personal design challenge for the future is actually integration. It's about thinking about the intuitive and the analytical.

Art and science are not separate.

Pre-Departure High School Physics Lesson: Our high school physics teacher had a ball.

She said, "This ball has potential energy.

But nothing happens to it and it can't do any work until I drop it and change state. ”

I like to think of ideas as potential energy.

They're really cool, but nothing happens unless you take the risk and do it.

This conference is full of great ideas.

We are going to share a lot with people.

But nothing will happen unless you take the risk and put the idea into action.

We need to revitalize art and science today.

We have to take responsibility for the future.

I can't hide that it's for the benefit of the company, or that it's just business, or that I'm an artist or a scholar.

Here's how to judge what you're doing. I talked about balancing intuition and analysis.

As my favorite cynic, Fran Lebowitz, said: "There are three biggest concerns..." -- I'll add more design here -- "...is it appealing?"

That's intuition.

"Is it funny?"--analytical and "Does it know its place?"--balance.

thank you very much.

(applause)

This is a sculpture I made, a way of releasing a certain form into an object with different degrees of freedom.

So you can balance on the points.

This is a bronze ball, an aluminum arm here, and this wooden disk.

And the wooden disc was really conceived as something to grip and to make the hand slippery.

It's aluminum so it's very light.

Bronze is a hard and durable material that rolls on the ground.

Inside the bronze sphere is a lead weight, passing between two bearings that balance the weight in this way, allowing it to swing freely on its axis.

So it will be possible to rotate.

And the sphere has the property of balance that it always remains stationary and looks the same when viewed from any direction.

However, if you put something on top, the balance will be lost. So it flips over.

But in this case, the interior swings freely against the sphere, so you can stand on one point.

And this object had a second level. It wanted to express the proportions that I was interested in. That is, the diameter of the moon and the diameter of the earth are proportional to each other.

From really early on, I wanted to make things float in the air.

And I thought of a lot of ideas.

This is a sculpture I made - magnetically levitated.

The problem is that it's a bit dangerous.

Museums are usually closed.

But it's, uh, let's see if we can do a little manipulation without it, uh, oops.

So it just floats above a permanent magnetic field and is stable in all directions.

However, there is a slight constraint here to not exceed the top of the field.

It's like surfing on the magnetic field of a wave crest.

And it supports and stabilizes the object.

Admin, I think you can wrap the tape around it.

I have a sort of collection of videos of different installations that I can narrate.

This is a sculpture depicting the sun and earth in proportion.

Expressing eight and a half minutes that require light and gravity to connect the two.

So here is Earth. It is a size of less than 1 mm, which is carved out of solid brass.

And here is a similar sculpture.

It's the sun at its edge.

And in a series of 55 balls, each ball and the space between them decreases proportionally until we reach this little globe.

It is located in Daejeon Sculpture Park.

This is a proportionate depiction of the Moon and its distance to the Earth.

This is a small floating stone ball.

You can see that the small tether is magnetically levitated.

And here's the first part -- the sun is 109 times the diameter of the earth, so this makes 109 spheres.

And this is the size of the sun.

And each of these small spheres is the size of the Earth relative to the Sun.

It consists of 16 concentric shells. Each has 92 spheres.

It is located in the 12th-century Alchemist's Courtyard.

I thought the sun was like the ultimate alchemist. (Laughter) Now, again, this is a slice from the Earth's equator.

And the moon floats in the center. And here in France.

It is located in Sapporo.

Balance on the shaft and ball just above or slightly above the center of gravity. This means that the bottom half of the object is only slightly heavier.

You can see it spinning here.

It weighs about a ton or more than a ton.

It is made of stainless steel and is quite thick.

But it is so balanced in equilibrium.

It is susceptible to movement due to air currents.

This is also the kind of work I do.

These are these arrays. All of these spheres are suspended, but have magnets in them horizontally, making them all like compasses.

So, for example, all red faces face one direction, namely south.

And the blue side, that is, the compliment, is facing the other side.

Turn around and you'll see a different color.

It is based on the structure of diamond.

A diamond cell structure was the starting point.

And there was a large space in the cavity between atoms.

So I put one more element in each.

These were white spheres.

Then there was a video projector that intermittently projected onto the sphere.

It therefore captures a portion of the image and creates a sort of three-dimensional color volume as the user walks through the object.

This is what I made using the haptic communication system.

The idea was to isolate the tactile element of the sculpture and incorporate it into a communication system.

The idea is to move a sculpture, or ball, that is directed around a room by a computer.

This is a clock that I designed.

Buckminster Fuller's Dymaxion map is compiled here.

It rotates once a day in sync with the Earth.

And this is kind of a harder project to build.

(Laughter) There's a diamond bottom lake here.

So it's a floating island with water, fresh water, and you can fly from place to place.

I think this will grow with nanotechnology in the future.

I have a wide range of interests in my work.

And part of that is just the idea of ​​creating media. Media as sculpture. Simply creating the medium that composes the sculpture is what keeps it fresh and ever-changing.

And I've always been interested in the concept of the crystal ball.

And the idea of ​​being able to see what's in a crystal ball and predict the future, or in the case of TV, like a magic box where anything can appear.

Long ago, in the late 60's, I was influenced by thinking about Buckminster Fuller's grand project for an electronic globe across from the United Nations. I was thinking about things like the space program and the Whole Earth Catalog at the time.

I was thinking about mass producing a spherical TV that could be connected to an orbiting camera satellite.

So if the next movie could be screened here.

It has evolved through various iterations over the years.

However, the current version of this is a flying airship about 35 meters in diameter and about 110 feet in diameter.

The entire surface is covered with 60 million red, blue and green diodes, enabling high-resolution images even in sunlight.

I came with a plan.

I took this to Paul McCready's company AeroVironment to do a feasibility study, and they analyzed it and came up with a lot of innovative ideas on how to push it forward.

So we have a physical plan for how this can actually be achieved.

This is the ship's control room.

The idea of ​​this air genie is that it can transform and become anything.

It's like a travel show.

It has speakers on it. And it has a camera on it.

Therefore, it can perceive its environment and then mimic that environment and disappear.

This is the state where the leg is retracted.

The cabin can be opened or closed according to your preference.

It weighs about 20 tons.

It has a generator.

It can generate about 1 million kilowatts to be bright enough to be seen in sunlight.

The idea of ​​this is to make a kind of travel show.

It will truly be devoted to art and exchange.

With a crew of artists and musicians on board, the object actually becomes a kind of conscious object that reacts to the moment, allowing it to perceive and interact with beings that it can communicate with.

Completely silent and pollution-free.

It has an electric motor with a new propulsion system.

You can interact with a large number of people in a variety of ways.

My main interest is how it works as a way to go to, say, a college campus and talk about earth science and the world and the state of the earth.

The default image for the object is probably a high resolution image of the Earth.

But then we can interact with it to show plate tectonics, global warming issues, migration, and all the other things that interest us today.

And at night, the idea is to use it as a kind of rave situation where people can chill out and enjoy the music, the lights, everything.

So you could land in a park, for example.

Alternatively, this could represent college green.

A corresponding website is then created to display the itinerary.

And interact with the same kind of images.

It can also be open code, so people can work with it.

It will be a forum for people to share their ideas of what they would like to see on this type of giant screen.

That's all.

have understood. thank you.

(applause)

Last year, I showed these two slides to show that for most of the last three million years, the Arctic ice sheet, which was about the size of the 48 mainland states, has shrunk by 40 percent.

However, this does not give an indication of the thickness of the ice, thus underestimating the severity of this particular problem.

The Arctic ice sheet is, in some ways, the beating heart of the Earth's climate system.

It expands in winter and contracts in summer.

The next slide I'm going to show you is a fast-forward to what happened in the last 25 years.

Permanent ice is marked in red.

As you can see, it swells to a dark blue color. This is annual ice in the winter and shrinks in the summer.

More than five years old, the so-called permanent ice can be seen here, almost like blood, flowing from the body.

In 25 years, so much has changed.

This is a problem because global warming heats the frozen ground around the Arctic Ocean, where there is a large amount of frozen carbon that, when thawed, is converted to methane by microorganisms.

Compared to the total amount of global warming pollution in the atmosphere, that amount could double once this tipping point is crossed.

Several shallow lakes in Alaska are already actively pumping methane out of the water.

Katie Walter, a professor at the University of Alaska, went out with another team to another shallow lake last winter.

Video: Oh! (laughs) Al Gore: She's fine. The question is whether we will.

One reason is that this massive heat sink heats Greenland from the north.

This is a river that melts every year.

But the volume is much higher than ever before.

This is the Kangerlussuaq River in southwestern Greenland.

If you want to see how land-based ice melts and sea levels rise, this is the place to reach the ocean.

These flows are increasing very rapidly.

On the other side of the globe is Antarctica, the largest mass of ice on Earth.

Scientists reported last month that the entire continent is now in a negative ice balance.

And West Antarctica, which has emerged over several submarine islands, is melting particularly rapidly.

This is equivalent to 20 feet above sea level, similar to Greenland.

It is the third largest mass of ice in the Himalayas. At the top you can see a new lake that was a glacier a few years ago.

Forty percent of the world's population derives half of their drinking water from the molten stream.

This glacier in the Andes Mountains is the source of the city's drinking water.

traffic has increased.

But when they run out, so does a lot of drinking water.

In California, Sierra Nevada snow cover has decreased by 40%.

This hits the reservoir.

And as you read, the forecast is serious.

All over the world this drying up is leading to a dramatic increase in fires.

And all over the world disasters are increasing at a totally abnormal and unprecedented rate.

In the last 30 years, it has quadrupled from the previous 75 years.

This is a totally unsustainable pattern.

If you look at it in a historical context, you can see what this is doing.

Over the past five years, we have added 70 million tons of CO2 to our oceans every 24 hours, or 25 million tons every day.

Look carefully at the region of the Eastern Pacific Ocean, which extends westward from the Americas and flanks the Indian subcontinent. Ocean oxygen is rapidly depleted there.

The burning of fossil fuels is the biggest contributor to global warming, along with deforestation, which accounts for 20% of it.

Oil is the problem, but the most serious problem is coal.

The United States is one of the two largest emitters, along with China.

And there are proposals to build even more coal-fired power plants.

But we are starting to see big changes.

Here are some that have been canceled in the last few years and some green alternatives have been proposed.

(Applause.) But there is a political struggle in our country.

And the coal and oil industries spent $200.5 billion on promoting clean coal last calendar year, which is a contradiction.

That image reminded me of something.

(Laughter) Around Christmas, my home in Tennessee had a billion gallons of coal sludge spilled.

You've probably seen it on the news.

Nationally, it is the second largest waste stream in the United States.

This happened around Christmas.

This was one of the coal industry advertisements around Christmas.

Video: ♪♫ Coal Man Frosty is a cheerful and happy soul.

He's wealthy here in America and helps our economy grow.

Miner Frosty is getting cleaner every day.

He is affordable and lovable, and workers keep their salaries.

Al Gore: This is the source of much of West Virginia's coal.

The largest miner on the summit is the president of Massey Cole.

Video: Don Blankenship: Let me be clear. Al Gore, Nancy Pelosi, Harry Reid, they don't know what they're talking about.

Al Gore: So the Climate Alliance launched two campaigns.

This is one of them and part of one of them.

Video: Actor: At COALergy, we see climate change as a very serious threat to our business.

That's why our main goal was to spend a lot of money on advertising campaigns that reveal and complicate the truth about coal.

Coal is not actually dirty.

We think it's clean and smells good too.

So don't worry about climate change.

Leave it to us.

(laughter) Video: Actor: Clean Cole -- You've heard about it a lot.

Let's take a tour of this state-of-the-art clean coal facility.

wonderful! The sound of the machine is a little noisy.

But that's the sound of Clean Coal Technology.

Coal burning is one of the main contributors to global warming, but the remarkable clean coal technology seen here changes everything.

Please take a good look. This is today's clean coal technology.

Al Gore: Finally, positive alternatives fit our economic and national security challenges.

Video: Narrator: America is in crisis -- the economy, national security, the climate crisis.

The thread that ties them all together is our addiction to carbon-based fuels, such as dirty coal and foreign oil.

But now there is a bold new solution to get us out of this mess.

100% clean electricity for America in 10 years.

A plan to get America back to normal, keep it safe, and stop global warming.

Finally we have a solution that is large enough to solve our problem.

Empower America. Find out more.

Al Gore: This is the last time.

Video: Narrator: It's about re-empowering America.

It's one of the fastest ways to break our addiction to the old, dirty fuels that are destroying our planet.

Man: The future is here. Wind, sun and new energy grids.

Man #2: New investments to create high paying jobs.

Narrator: Empower America. It's time to find out the truth.

Al Gore: An old African proverb says, "If you want to go fast, go alone.

If you want to go far, let's go together. ”

I have to go far away soon.

thank you very much.

(applause)

The only conversation in my life that lifted me the most was with a woman. She told me that a few days ago she drove her Jeep Wrangler to the edge of the Grand Canyon and sat there, revving the engine, thinking about driving there.

I have severe social anxiety and felt completely at ease in that conversation.

(Laughter.) She told me what had happened in her life in the last few days and months, what she was thinking at that moment, why she wanted to die, why she didn't.

We nodded and half-smirked, then it was my turn to tell the story until I made my way to the dining table in the sanitation community area of ​​the mountain town hospital's mental health wing.

I took too many sleeping pills, so after they treated me, they said, "I would appreciate it if you could come as a guest in the psych ward."

(Laughter.) We joked that it would be a much better postcard if she killed herself.

(laughs) We talked about the store.

(Laughter) She allowed me to be deeply depressed and at the same time to have real connections with others.

For the first time, I recognized that I was a human being living with depression and felt good about it. I felt like I wasn't a bad person for depression.

Now imagine that among the people at that table were your family and close friends.

Are you comfortable talking to them?

What would you do if you came to your kitchen table instead of the hospital and were told you were really depressed?

The World Health Organization says depression is a leading cause of illness and disability worldwide, affecting 350 million people.

The National Institute of Mental Health reports that 7% of Americans experience depression in one year.

So depression is very common, but my experience is that most people don't want to talk to someone who is depressed unless they pretend to be happy.

The bright appearance is suitable for casual interaction.

A depressed person, imprisoned in the infinite darkness of his soul and having lost all hope of escaping, may ask for more syrup in his pumpkin spice latte without explaining that it is necessary. Again (laughs).

(Laughter) Depression doesn't reduce a person's desire to connect with other people, it just reduces their ability to connect.

So, regardless of what you think, talking to friends and family members who are living with depression can be very easy and even fun.

We're not talking fun like taking a Facebook selfie with Lady Gaga at a basement party, but about the fun of people casually enjoying each other's company.

No one feels awkward and no one blames sad people for ruining the holidays.

Why do these grooves exist?

Others, on the other hand, live with depression that causes them to act uncomfortable or disruptive because they're fighting a war in their heads that other people can't see.

On the other hand, the vast majority look across the ditch and shake their heads, "Why should I be so depressed?"

You may find that there are similar crossroads in your life as well.

Do you want to build a bridge over it?

You may not want to build bridges, but you are absolutely right.

Or maybe you want to build a stronger connection but have a lot of questions and concerns.

You are what is called a “curious person”.

(Laughter) Here are some possible reasons why some people may avoid people with depression.

If you talk to someone when they are depressed, you may be afraid that suddenly you will be responsible for their well-being.

You are not expected to become Dr. Phil.

Be friendly like Ellen.

(Laughter) You may worry that you don't know what to say and that every attempt at conversation becomes awkward. And the only time you feel safe is when you both give up talking and stare at your phone.

The most important thing to notice is not the words.

You may be afraid to see your own shadow.

If you've successfully overcome your personal emotional demons, that's great.

May the wind reach your back.

(Laughter) You can connect with people who are depressed, even the least rumored person in the world.

You may have heard that depression is contagious. You may be afraid of contracting depression.

Please bring hand sanitizer.

(Laughter) You are much more likely to experience the joy of human bonding.

Maybe you see people with depression differently.

You consider them flawed or flawed.

Multiple university studies have shown that A students are more likely to have bipolar disorder.

Our brains are not broken or damaged, they just work differently.

For years I thought happy people couldn't understand that.

(Laughter) Eventually, I stopped discriminating against happy people -- (Laughter).

I went from being miserable most of the time to enjoying life.

I have lived successfully with bipolar disorder and have also overcome other mental health conditions such as overeating, addiction and social anxiety.

So I live on both sides of this ditch.

And where necessary, I will provide guidance based on my experience to help build bridges.

It's not hard science, but I've worked with many people I know who have lived with depression to refine these suggestions.

First of all, here are some things you should avoid, or "don'ts".

One of the things that makes me the most uncomfortable is saying, "Stop it!"

Great idea. I like it. We just thought of it already.

(Laughter) Depression is the inability to overcome it.

(Laughter) (Applause) We feel it in our bodies, it's physical to us.

And medically, it's no different than telling someone with a broken ankle or cancer, "Just get over it."

Please don't be so desperate to fix us.

Thanks, but...

The pressure can make a depressed person feel like they're letting you down.

And what makes some people feel good may not work for us.

Eating ice cream won't cure depression...

It's a shame because it would be a dream come true.

(laughter) Please don't take negative reactions personally.

So, about a year ago, I have a friend who texted me that he was really lonely and depressed.

So I suggested some things to him and he was like, 'No, no, no.

And I got mad, why doesn't he accept my great wisdom?

(Laughter.) And then I remembered the times when I was feeling down and thinking I was destined for every possible future, suddenly everyone hated me, things like that.

It didn't matter how many people said otherwise. I didn't believe them.

So I told my friend that I cared, but I didn't take it personally.

Don't be upset because you no longer have joyful happiness.

Not a shark attack.

"Call the Coast Guard, my friend is grieving!"

(Laughter) We can be sad and okay at the same time.

Again, because our society teaches us the opposite, which is counterintuitive.

People can be sad and okay at the same time.

Therefore, some of this material may or may not apply to you personally.

Take something useful with you.

Remember you don't have to connect.

Here are a few suggestions, or "things to do", that might help, if you'd like.

Speak to us in your natural voice, okay?

(Laughter) We don't have to scream sad just because we're feeling down. No need to sneeze while talking to someone who has a cold.

(Laughter) It's not rude to be optimistic.

Are you okay with me?

If you offer to help, be clear about what you can and can't do.

I told people, "Call or text me anytime, but I may not get back to you that day."

Not making an offer, or making a narrow offer with very clear boundaries, is totally cool.

Give us a sense of control.

Please get consent.

I have a friend who reached out and said to me not too long ago when I was having an episode of depression.

May I call you every day?

Texting every day and calling later in the week?

what works for you? ”

With my permission, she earned my full trust and is still one of my best friends.

And my final suggestion is to socialize about not being depressed, which is normal.

I have a friend who called when people were worried about him and asked if he wanted to go shopping or help clean out the garage.

Your depressed friends can be a good source of unpaid work -- (laughter) What I really mean is invite them to contribute to your life in some way, even if it's as little as asking them to go see a movie they've always wanted to see in the theater.

So this is a lot of do's, don'ts, and what ifs, and it's by no means a definitive list.

The thing to remember is that they are all based on one guiding principle.

Thanks to the woman in my Jeep Wrangler, I was able to start my recovery effortlessly.

She spoke to me as if I belonged to her and contributed exactly as I did in that moment.

If you talk to someone who is depressed as if their life is as valuable, intense, and beautiful as yours, you are closing the gap and don't need to build a bridge between them.

Focus on that, not your words. Then it might be the most uplifting conversation of their life.

What can it do for your significant other?

What can it do for you?

thank you.

(applause)

Nearly 30 years ago, my country faced the need to rebuild everything from scratch.

After years of Soviet occupation, Estonia regained its independence, but we were left with nothing.

No infrastructure, no administration, no regulations.

Organizational confusion.

Inevitably, state leaders of the time had to make some bold choices.

There was a lot of experimentation and uncertainty, but there was also a bit of luck involved, especially in the fact that we were able to rely on many brilliant visionaries, cryptographers and engineers.

I was still a child then.

Today, we are said to be the most digitized society on earth.

I am from Estonia and have been filing taxes online since 2001.

We have been using digital IDs and signatures since 2002.

We have been voting online since 2005.

And today, nearly every public service imaginable — education, police, law enforcement, starting businesses, applying for benefits, checking health records, revoking parking tickets — is done online.

In fact, it's much easier to describe the three things you can't do online yet.

You have to go to get your ID, get married or divorced, or sell your property.

That's all.

So don't be surprised when I say I can't wait to start filing my taxes each year.

(Laughter) Because all I have to do is sit on the couch with my phone, swipe a few pages of pre-populated data about my income and deductions, and hit the send button.

After three minutes, look at the amount on the tax return.

In fact, it feels like a pretty rewarding experience.

You don't need a tax accountant, collect receipts, or do calculations.

And did I mention that I haven't visited a state office in almost seven years?

In fact, given the possibilities of today's technology, one feature of modern life that no longer exists is the labyrinth of bureaucracy.

In Estonia, it was almost completely exterminated with the cooperation of the government that promoted digitalization.

For example, ministerial work in the e-Cabinet is completely paperless.

The central idea behind this development is the transformation of the role of the state and the digitization of trust.

please think about it.

In most countries people don't trust their government.

And the government doesn't trust them either.

And all the complicated paper-based formal procedures are supposed to solve the problem.

Except don't.

They just make life more complicated.

I think Estonia's experience shows that technology can be a means to regain trust while building an efficient, user-centered service delivery system that proactively responds to the needs of its citizens.

We did not simply digitize bureaucratic work.

But rather by agreeing on some strong common principles, redesigning rules and procedures, eliminating unnecessary data collection and duplication of tasks, and being open and transparent.

Today, let's take a glimpse into some of the key design principles of e-Estonia.

First, it is imperative to guarantee the privacy and confidentiality of data and information.

This is achieved through strong digital identities issued by the state and compatible with everything.

In fact, every Estonian has one.

Identity is doubled by strong digital signatures that are accepted, used and legally binding in both Estonia and the European Union.

If the system can properly and securely identify who is using it after login, it will give citizens access to their personal data and all public services within one tool, allowing them to approve anything with digital signatures.

The second principle, one of the most transformative, is called "one-off".

This means that states cannot request the same data multiple times or store it in multiple locations.

For example, if you have already submitted your birth or marriage certificate to the population register, this data will only be stored here.

And no other agency will ever ask for it again.

Only once is a very powerful rule. This is to define the overall structure of national data collection, what information is collected and who is responsible for its maintenance, to ensure that data is not centralized or duplicated, and that data is indeed up to date.

This distributed approach also avoids the single point of failure problem.

However, data cannot be replicated or collected multiple times, so it must always be designed with secure and robust access to that information in mind so that public authorities can provide their services.

This is exactly the role of the data exchange platform called X-Road, which has been in use since 2001.

Just like a highway, it will connect public sector databases and registrars, local governments and businesses, orchestrate real-time, secure and regulated data exchange, and store an auditable trail of every movement.

Here is a screenshot of a live feed showing all the requests made on X-Road and all the services that X-Road actually facilitates.

This is the real picture of all connections between public and private sector databases.

As you can see, there is no central database at all.

Confidentiality and privacy are definitely very important.

However, in the digital world, the reliability and integrity of information is critical to operations.

For example, if someone changes your health record, for example allergies, without you or your doctor knowing, treatment could be fatal.

That is why in a digital society, a system like Estonia, where there are almost no paper originals, almost only digital originals, data integrity, data exchange rules, software components and log files are of paramount importance.

We use a form of blockchain that we invented in 2007, long before blockchain became popular, to check and guarantee data integrity in real time.

The blockchain is our auditor, ensuring that no access to or manipulation of data goes unrecorded.

Data ownership is another important principle in system design.

Are you concerned about the fact that governments, technology companies, and other companies around the world claim that the data they collect about you are theirs, generally deny access to that information, and often fail to prove how that information was used and shared with third parties?

I don't know, but it seems like a rather alarming situation to me.

The Estonian system is based on the principle that individuals are the owners of the data collected about them and therefore have an absolute right to know what information is collected and who has access to it.

When police officers, doctors, and other state employees access a citizen's personal information online, they will only be able to do so after logging in to the information they are authorized to see on the job.

This is then saved to a log file each time a request is made.

This detailed log file is part of the state's public service, providing true transparency and ensuring that privacy violations go unnoticed by residents.

Of course, this is just a simplified summary of all the design principles that go into building e-Estonia.

And now governments are stepping up their readiness for the use of artificial intelligence to build a whole new generation of public services: proactive services that are seamlessly activated based on the different life situations people may find themselves in, such as giving birth, unemployment, or starting a business.

Of course, running a digital society without paper backups can be problematic.

While we believe our systems are robust, we cannot be too cautious, as we experienced in 2007 when our first cyber incident occurred, literally blocking parts of our network and making our services inaccessible for several hours.

we survived.

However, the event put cybersecurity on top of the agenda, both in terms of hardening the platform and backing it up.

So how do you back up a nation-wide system in a small state where everything works so tightly together?

For example, you can export a copy of your data to the extraterritorial space of an embassy outside your country's territory.

There is now a data embassy that houses Estonia's most important digital assets, ensuring business continuity, data protection and most importantly, sovereignty.

By now, some of you may be thinking, "Where are the drawbacks?"

Well, going fully digital is administratively and, let's be honest, financially efficient.

Interfacing primarily with computer systems may somehow give the impression that the human element—the elected politicians and participation in the democratic process—is less important.

Others fear that ubiquitous technology could make their skills obsolete.

So, unfortunately, running the country on digital platforms has not saved us from political power struggles and social polarization, as we saw in the last election.

Well, until humans get involved.

One last question.

If everything is location independent and all services can be accessed from anywhere in the world, why can't others use some of these services, even if they don't reside within Estonian borders?

Five years ago we launched a government startup called the e-Residency program, which now has tens of thousands of participants.

These are businessmen and businesswomen from 136 countries who have established their businesses digitally, banked online, virtually run their companies on the e-Estonia platform within the legal framework of the European Union, all with electronic ID cards similar to mine from anywhere in the world.

The Estonian system is location-independent and user-centric.

Prioritize inclusiveness, openness and reliability.

Security and transparency are at the core.

The data then falls into the hands of its rightful owner, the person to whom the data refers.

Don't take my word for it.

Give it a try.

thank you.

(applause)

Have you ever felt lonely?

Do you feel the urge to connect but no one seems to really want to get in touch with you?

Or do you want to be with other people because it's Friday night, but you don't have the energy to go out, so instead you sit at home all night watching Netflix and feel more alone than ever?

You feel like a monster among humans who knows how to function.

This was loneliness for me.

So I'm an artist, and I process my emotional world by sharing my emotions through art.

When you share your feelings with someone, and they understand and share your feelings, you create a deep emotional connection.

This is why you can be surrounded by hundreds of people, jump from candidate to candidate, and still feel alone.

It's because we don't have those deep connections.

I have always been a happy child.

I think there are very few pictures where I'm not smiling, laughing, or joking.

And this lasted until...

Well, it still is.

However, when I was younger, I had a large group of friends until I moved to another city for my first job as a cartoonist.

And like many young and prosperous people on the planet, I focused all of my energy on my working life.

But when you dedicate 90% of your daily capacity to being successful at work, you obviously can't afford to care about other important aspects of your life, like your relationships.

Developing friendships in adulthood is a job.

Connections should be consistent.

Must be open and honest.

And this was all I struggled with. Because I tend to camouflage my true feelings by always trying to appear happy or to solve problems and make other people happy too.

And I know many of us are guilty of this. Because it's an easy way to stop thinking about your own problems.

isn't it?

teeth? teeth? teeth?

(laughter) Okay.

The turning point came just a few years ago when I found myself in an emotionally abusive relationship.

He isolated me and made me feel lonelier than ever.

It was the lowest point in my life, but it was also my wakeup call because for the first time I felt truly alone.

Many people put their emotions into their art.

There are countless books, movies, paintings, and music that capture the real emotions of artists.

So I did the same thing myself as an artist.

I shared my feelings.

I wanted to help people cope with loneliness.

So, I wanted them to understand that and really experience it through my art in the form of an interactive story, a video game.

So in our game -- we named it "Sea of ​​Solitude" -- you're a guy named Kay. She suffers from a very strong sense of loneliness and her inner feelings - anger, hopelessness and worthlessness - turn outward and she becomes a monster.

This game -- yes, Kay -- is really a representation of me and the path I took to overcome my conflicts.

In fact, the game takes place in Kay's mind, where you roam her tear-filled world and the weather changes with her mood, her mood changes.

And, well, the only thing Kay wears is a backpack.

It is a baggage that we all carry with us throughout our lives.

And Kay doesn't know how to deal with her emotions correctly. So the backpack gets bigger and bigger until it finally bursts and you are finally forced to overcome your own conflicts.

Different expressions of loneliness come into play in our story.

Loneliness due to social exclusion is very common.

In our game Kei's little brother is being bullied at school and just wants to hide and run away.

And we paint him as a giant bird monster surrounded by thick fog.

The player must actually walk around his school and feel the harm his brother has been through. Because for a long time no one listened to him.

But the moment friends and family started listening, the first steps were taken to overcome this form of loneliness.

It also represents loneliness in relationships, such as when a parent just stays together for their children, but ends up hurting the whole family.

If you literally put a player in between your parents while they fight, you get hurt in the middle.

They didn't even know their daughter Kay was there until she collapsed.

It also expresses loneliness through mental health issues with Kay's boyfriend, who suffers from depression, and shows that sometimes it's most important to focus on your own health first.

Boyfriends also tend to camouflage their feelings, so they look like lone radiant white wolves.

However, the moment he starts interacting with his girlfriend Kay, the mask peels off, revealing a black dog underneath. It's depression.

Sometimes we put a smile on our face without addressing the problem at hand, which can ultimately exacerbate the situation, affect the people around us, and damage our relationships.

Thus, we portray Kay herself as having her basic emotions ripped apart.

Some will help you, others will try to stop you.

Self-doubt is a huge creature, constantly telling Kay how worthless she is and that she should give up.

Just like in real life, self-doubt gets in the way and seems impossible to overcome.

Destroying the ubiquitous self-doubt is a slow process.

But in the game, you can slowly, for example, make her wither, so that she goes from self-doubt to actually healthy suspicion, and eventually to be able to trust her advice.

Self-destruction is also shown.

It's a giant monster lurking beneath the surface at all times nearby.

Self Destruction is actually the game's main antagonist, and she's constantly trying to drown you in a sea of ​​tears.

But when she actually drowns you, you wake up just moments ago and have a chance to progress again.

We wanted to show that everyone goes through hardships in life.

But at least, if you're willing to get up and move forward, you're very likely to get through it, step by step.

Joy is something Kay can't really hug or touch.

It is always far away.

We drew Joy as a child version of Kay in a yellow raincoat. So she won't lose to a sea of ​​tears.

But sometimes it turns into an obsession for Kay, like when Joy starts getting obsessed with her boyfriend, and it actually starts to hurt.

Joy won't return to normal until Kay realizes that her happiness shouldn't depend on anyone but herself.

Our monsters therefore seem huge and terrifying, but when you overcome resistance and approach them, you quickly discover that they are not monsters at all, but simply weak beings overwhelmed by what life throws at them.

Whether it's self-doubt or self-destruction, all of these feelings don't completely disappear in-game.

The key message is to not only pursue joy and happiness, but also to embrace all your emotions and balance them with being okay and sometimes not okay.

Everyone has a loneliness story to tell.

This realization changed everything for me.

I became more open about my emotions and focused more on my personal life, friends and family.

When we released the game, literally thousands of fans wrote to us. They all shared their stories with us and told us they weren't so lonely anymore because they played our game.

Many people wrote to me that for the first time in decades they felt hopeful for a better future for themselves.

Many people have written to us that they are now seeking therapy because playing our game gave them hope to overcome their own struggles.

Our game is not therapy.

It's just me and my friends sharing stories through art and video games.

But we are deeply grateful for all the messages that have made people feel better just because we shared our story.

So...

I never quite got over the urge to help others.

But I don't want to get over it.

I love it.

All you need is to make it a healthy size so that it doesn't just get in the way of your deeper relationships, but it also helps you connect with people.

So, if you have an inner monster born out of negative emotions, killing it is not only the goal, but it is also important to understand that we humans are complex beings.

See what parts of your life are bigger than others.

Focus on the emotions you feel little or too much and work towards lowering those peaks.

Above all, it is important to understand that emotions and conflicts make us human.

thank you.

(applause)

In 1990, the Italian government hired top engineers to stabilize Pisa's famous Leaning Tower.

There have been many attempts to straighten the tower over its 800-year history, but the team's computer models made the situation more urgent.

They predicted that the tower would fall when it reached an angle of 5.44 degrees, but now it is tilted at 5.5 degrees.

No one knew how the tower was still standing, but the danger was clear. They had to solve a problem that had plagued engineers for centuries, and they had to do it quickly.

To understand their situation, it helps to understand why the tower leaned in the first place.

In the 12th century, the wealthy maritime republic of Pisa set out to transform its Cathedral Square into a magnificent landmark.

Workers decorated and expanded the existing church, adding a huge domed baptistery to the square.

In 1173, construction began on a separate bell tower, or bell tower.

Engineers and architects of the time were masters of the craft.

But no matter how much we knew about engineering, we knew very little about the ground we stood on.

Pisa's name comes from the Greek word for 'wetland', a word that perfectly describes the clay, mud and wet sand that lies beneath the city's surface.

The ancient Romans countered a similar situation with huge stone pillars called piles that rested on the earth's stable bedrock.

However, the tower's architects thought a 3-meter foundation was sufficient for the relatively short structure.

Unfortunately for them, less than five years later, the south side of the tower was already underground.

Such a change in foundation would normally be a fatal flaw.

As workers add more weight, the pressure from the upper floors can cause the structure to sink and its tilt to increase fatally.

However, construction on the fourth floor was halted for nearly a century as Pisa fell into a long war.

This long period of dormancy stabilized the soil, and when construction resumed in 1272, the foundation had a slightly more stable footing.

Under the direction of architect Giovanni Di Simone, the workers compensated for the tower's slight tilt by raising several floors on the south side.

However, the weight of the additional masonry caused its sides to sink even deeper.

By the time the 7th floor and bell chamber were completed, the angle of inclination was 1.6 degrees.

Over the centuries, engineers have tried numerous strategies to deal with lean.

In 1838 they dug a passage around the base to survey the sunken foundations.

However, removing the supporting sand only worsened the slope.

In 1935, the Italian Corps of Engineers injected mortar to strengthen the base.

However, the mortar was not evenly distributed across the foundation, resulting in sudden falls again.

The failure of all these attempts and the ever-sinking foundation has brought the Tower closer to its tipping point.

And without a clear knowledge of the composition of the soil, engineers could neither pinpoint the tower's lethal angle nor devise ways to stop its fall.

In the years after World War II, researchers developed tests to identify these missing variables.

Then in the 1970s, engineers calculated the curved tower's center of gravity.

Using this data and new computing techniques, engineers were able to model soil hardness, tower trajectory, and the exact amount of excavation required to keep the tower standing.

In 1992, the team dug a diagonal tunnel and removed 38 cubic meters of soil from beneath the north end of the tower.

The structure was then temporarily balanced with 600 tons of lead ingots, after which steel cables were used to secure the base.

More than six centuries after its construction, the tower was eventually straightened to a tilt of about 4 degrees.

No one wanted the tower to collapse, but neither did they want to lose the landmark's most famous feature.

Today, the tower is 55 or 56 meters high and should remain a stable monument to the beauty of imperfections for at least 300 years.

During World War I, one of the dreads of trench warfare was a poisonous yellow cloud called mustard gas.

Those who were unlucky to be exposed could not breathe air, burned their eyes, and developed large blisters on their exposed skin.

Scientists desperately tried to develop an antidote to this vicious weapon of war.

In the process, it was discovered that the gas had irreparably damaged the bone marrow of affected soldiers, halting their ability to make blood cells.

Despite such frightening effects, it gave scientists an idea.

Cancer cells share features with bone marrow and both replicate rapidly.

So can one of the atrocities of war become a champion in the fight against cancer?

Researchers in the 1930s studied this idea by injecting a compound derived from mustard gas into the veins of cancer patients.

It took time and trial and error to find a treatment that did more good than harm, but by the end of World War II, what would become known as the first chemotherapy drug was discovered.

There are now over 100 of them.

Chemotherapy drugs are given as tablets or injections and use "cytotoxic agents," meaning compounds that are toxic to living cells.

Basically, these drugs harm every cell in the body to some extent, even healthy cells.

However, they reserve their most potent effects against the rapidly dividing cells that are so characteristic of cancer.

For example, consider the first chemotherapeutic agents called alkylating agents that are still in use today.

They are injected into the bloodstream and delivered to cells throughout the body.

When cells enter and expose DNA for copying, the components of the double helix structure of DNA can be damaged, leading to cell death unless the damage is repaired.

Because cancer cells grow rapidly, they take up high concentrations of alkylating agents, frequently exposing their DNA and seldom repairing it.

As such, they have time to repair damaged DNA and die more frequently than most other cells that do not accumulate the same concentration of alkylating agent.

Another form of chemotherapy includes compounds called microtubule stabilizers.

Cells contain tiny tubes that are assembled and then disassembled to aid in cell division and DNA replication.

Once inside the cell, microtubule stabilizers prevent those small tubes from breaking down.

This prevents cells from completing replication, leading to cell death.

These are just two examples of the six chemotherapy drugs used to treat cancer today.

However, despite the great benefits of chemotherapy, it has one major drawback. It does so by influencing other healthy cells in the body that naturally need to regenerate rapidly.

Hair follicles, mouth cells, gastrointestinal lining, reproductive system, and bone marrow are almost as devastating as cancer.

Similar to cancer cells, the rapid generation of these normal cells means that they have more frequent access to resources, making them more susceptible to the effects of chemotherapeutic agents.

This causes common side effects of chemotherapy such as hair loss, fatigue, infertility, nausea and vomiting.

Doctors usually prescribe options such as strong anti-nausea medications to help manage these side effects.

For hair removal, a device called a cold cap can reduce the temperature around the head, constrict blood vessels, and limit the amount of chemotherapy drugs that reach the hair follicles.

Then, after the course of chemotherapy is over, the healthy tissue severely affected by the drugs recovers and begins to regenerate normally.

In 2018 alone, more than 17 million people were diagnosed with cancer worldwide.

But chemotherapy and other treatments have changed the outlook for many.

Consider the fact that up to 95% of testicular cancer patients are alive thanks to advances in treatment.

Even in patients with acute myeloid leukemia, an aggressive hematological cancer, chemotherapy results in an estimated 60% of patients under the age of 60 in remission after first-line therapy.

Researchers are developing more precise interventions that target only the cancer cells of interest.

This can improve survival while reducing damage to healthy tissue, making one of the best tools for fighting cancer even better.

I'm no cook at all.

please do not worry. This is not a cooking demonstration.

But I want to talk about something that is important to all of us.

And it's bread. Something as simple as our basic, most basic human staple food.

And I think very few people go a day without eating bread in some form or another.

Bread is standard unless you are on the California low carb diet.

Bread isn't just standard in the Western diet.

As you'll see, it's actually a workhorse of modern life.

So I bake bread for you.

Meanwhile, my life is going to be complicated because I am also talking to you. Please be patient.

First, a little audience participation.

Here are two loaves of bread.

One is a standard supermarket product, prepackaged white bread called Wonderbread.

(Laughter) I didn't know this word until I came here.

And this is more or less a whole grain, homemade, little bakery loaf.

please. I would like to raise my hand.

Who likes whole grain bread?

Now let me do this another way. Who likes Wonderbread better?

(Laughter) I have two provisional male hands.

(Laughter) Now the question is, why is that?

I think it's because I feel that this kind of bread is the real deal.

It's about the traditional way of life.

It's probably a more realistic, more honest way.

This is an image of Tuscany. Farming is still seen as a beauty there.

And so is life, really.

And this is about good taste and good traditions.

Why do you have such an image?

Why do we feel more true than this?

Well, I think it has a lot to do with our history.

In the 10,000 years since agriculture evolved, most of our ancestors were actually farmers, or were closely associated with food production.

And we have a mythical image of what rural life was like in the old days.

Art helped maintain such an image.

It was a mythical past.

Of course, the reality is quite different.

These poor farmers worked their land by hand and with animals, and had yield levels comparable to the poorest farmers in West Africa today.

But we, in the last few centuries, or decades, have somehow begun to cultivate an image of the mythical rural farming past.

The Industrial Revolution arrived just 200 years ago.

While I'm starting to make bread for you here, it's very important to understand what that revolution has brought us.

It gave us strength. It brought us mechanization and manure.

And that really boosted yields.

And even dreadful things like picking beans by hand can now be done automatically.

These are all really big improvements, as we'll see.

Of course, we have, especially in the last decade, managed to involve the world in a dense chain of supermarkets, a chain of global trade.

And that means you now eat products that can come from all over the world.

That is the reality of our modern life.

Now you may like this bread better.

Excuse me, but this is what it looks like.

Historically, however, the bread that is actually relevant is this white wonder bread.

And don't skimp on white bread. Because I think it really epitomizes the fact that bread and food has become plentiful and affordable for everyone.

And it's a feat of which we are less conscious.

But it changed the world.

This bland, troubled little bread changed the world.

So what's going on?

The best way to find out is to do some simplistic statistics.

Since the 1960s, the advent of the Industrial Revolution, accompanied by the modernization of agriculture in the last few decades, has increased food availability in the world by 25% per person.

And the world population doubled during that time.

This means more food is available than ever before in human history.

And it is a direct result of our success in increasing our production scale and output.

And this, as you can see, applies to all countries, including the so-called developing countries.

What happened to our bread in the meantime?

Here food abundance also meant that the number of people working in agriculture could be reduced to less than 5 percent of the population on average in high-income countries.

In the United States, only 1 percent of the population actually works in agriculture.

And it frees us all up to do other things, sit in TED meetings, and not have to worry about food.

Historically, this is a very special situation.

Never before has the responsibility of feeding the world been in the hands of so few people.

And never before have so many people been unaware of that fact.

As food became more abundant, so did bread.

And with lower prices, bread makers decided to add all sorts of things.

I added more sugar.

Add all sorts of things like raisins, oil and milk to make bread. They range from simple foods to calorie support.

And today bread is associated with obesity, which is very strange.

It is the basic, most basic food we have eaten over the last ten thousand years.

Wheat is the most important crop, the first crop we domesticated, and the most important crop still grown today.

However, this resulted in a strange high-calorie concoction.

And that's true not only in this country, but all over the world.

Bread migrated to tropical countries, where the middle class was eating French rolls and hamburgers, and bread was considered far more convenient than rice or cassava for commuters.

So bread is not only a staple food and a source of calories associated with obesity, but also a source of modernity and modern life.

And in many countries, the whiter the bread, the better.

This is the story of bread as we know it today.

But, of course, the price of mass production came with the need for massive travel.

And the expansion means destruction of many landscapes and destruction of biodiversity. Here in the Cerrado soybean fields in Brazil, there is still a lone emus.

Water pollution, everything you know, destruction of our habitats, the cost has been enormous.

All we have to do is get back to understanding what food is.

I have to ask you guys here.

How many people can actually distinguish wheat from other grains?

How many people can actually make bread this way without using a bread machine or prepackaged flavors?

Can you really bake bread? Do you know the actual price of a loaf of bread?

We've gotten so far away from what bread really is, which is also very strange, evolutionarily speaking.

In fact, not many people know that our bread was of course not invented in Europe.

Especially invented by Iraqi and Syrian farmers.

The small ear to the left of center is actually the progenitor of wheat.

This is where it all came from, and where the farmers actually led us down the path of bread 10,000 years ago.

Now, with all this popularization and mass production, it's no surprise that there's a movement against it here in California.

The opposition movement said, "Let's go back to the topic.

Let's go back to traditional farming.

Go back to small farmers markets, small bakeries and more. " It is wonderful.

don't we all agree? I certainly agree.

I would love to go back to Tuscany for this kind of traditional atmosphere, gastronomy and delicious food.

However, this is incorrect.

And the fallacy arises from idealizing the past that we have forgotten.

If we do this, if we want to continue traditional small-scale farming, we will in fact push these poor farmers and their husbands, among whom I have lived for many years, worked without electricity and water, and tried to improve their food production, into poverty.

They want the tools to increase production, something to fertilize the soil, to protect and market the crop.

Small scale cannot be considered the solution to the world's food problems.

If you can afford it, it's a luxury solution for those of us who can afford it.

In fact, we don't want this poor woman plowing the land like this.

A return to local food, if we just say small-scale production, as is the trend here, means that Scandinavia doesn't have oranges, so poor people like Hans Rosling can't even eat them anymore.

Therefore, local food production is ending.

But we also don't want to be pushed into rural poverty.

And we don't want to drive the urban poor into starvation.

So we have to find another solution.

One of our problems is that global food production needs to increase very rapidly (doubling by around 2030).

The main factor in that is actually the meat.

And meat consumption in Southeast Asia, especially China, is pushing up grain prices.

Demand for animal protein will continue.

Perhaps someday we can discuss alternatives in another talk, but this is our driving force.

So what can we do?

Can we find a solution to produce more?

yes. However, it requires mechanization.

And I am seriously appealing here.

I feel strongly that we cannot ask a small farmer to plow the land and bend down to grow a hectare of rice 150,000 times just to plant and weed.

You cannot get people to work under these conditions.

We need sensible and unobtrusive mechanization that avoids the problems of large-scale mechanization in the past.

So what can we do?

We have to feed the three billion people in our cities.

We are not going to do it through small farmers markets. Because these people don't have a small farmers market at their disposal.

they are low income. And they benefit from cheap, affordable, safe and diverse food.

That is what we must aim for in the next 20 to 30 years.

But yes there are some solutions.

And let's do just one simple conceptual thing. Suppose we plot science as a proxy for production process and scale control.

As you can see, we started traditional farming in the left corner. It was kind of small and poorly managed.

We aim for large scale and very sophisticated control.

What I would like to see for us is to keep the science and take in more science, but at some kind of regional scale - not just in terms of the scale of the sector, but in terms of the food network as a whole.

We should move there.

And the ultimate, which may not apply to crops, is that we have a completely closed ecosystem, the horticultural system in the upper left corner.

So we have to think differently about agronomy.

For most people, the image of agricultural science – and there aren't many of you here who are farmers – is that it's bad, it's pollution, it's big, it's environmental destruction.

it is not necessary.

We need science, but we need more science. And we need good science.

So what kind of science can we do?

First of all, I think the existing technology can be improved more.

Use biotechnology where useful, especially in pest and disease resistance.

For example, some robots can recognize weeds with a resolution of 0.5 inches.

We are irrigating smarter.

If you don't want to spill water, you don't have to.

And we have to be very sober about the comparative advantage of small versus large.

We need to think of land as having multiple functions.

It has various functions.

It must be used for various purposes such as residential, natural and agricultural.

We also need to rethink livestock.

Go to the region, go to the city's food system.

I would love to see a parking lot or an underground fish pond.

I want to make gardening and greenhouses on the residential area.

And we want to use the energy from those greenhouses and the fermentation of crops to heat residential areas.

There are many ways.

Bio-agriculture cannot solve the world's food problems.

But we can do so much more.

And when I go back to your country or stay here, I would like to ask you to ask your government for an integrated food policy.

Food is as important as energy, security and the environment.

Everything is connected.

That's why it can be done. In fact, densely populated countries like the Dutch River Delta where I live combine these features.

So this is not sci-fi. The social sense of making the countryside more accessible to people can also be combined, for example housing for the chronically ill.

There are many things we can do.

But there is something you must do. It's not enough to say, 'Let's be more bold with science in agriculture.'

You have to go back and think about your own food chain.

talk to the farmer When was the last time you went to a farm and talked to a farmer?

Talk to people at restaurants.

Understand where you are on the food chain and where your food comes from.

Realize that you too are part of this enormous chain of events.

And it allows you to do other things.

And most of all, food means respect to me.

It's about understanding, when eating, that there are still many people in this situation who struggle to eat on a daily basis.

And the simplistic solutions we sometimes embrace, thinking that doing everything by hand would be the solution are not really morally justified.

We need to help lift them out of poverty.

We need to make them proud to be farmers because they are the reason we live.

As I said earlier, never before has food responsibility been in the hands of so few people.

And it's so cheap now that you never could afford to take it for granted.

And I don't think anyone in our own traditions did a better job of expressing the idea that food is ultimately sacred.

It's not about nutrients or calories.

It's about sharing. It's about honesty. It's about identity.

No one said this so beautifully 75 years ago when Mahatma Gandhi spoke of bread.

He didn't talk about rice in India. “For those who have to go without two meals a day, God appears only as bread,” he said.

So when I finish the bread here, and I'm baking it, I try not to burn my hands.

Let me share with you guys in the first row here.

I will share some of the food with you.

Please take some of my bread.

And when you eat it, when you try it, please stand up.

hold it a little

I want you to think that every bite is connected to the past and the future. Anonymous farmers who were the first to breed the first wheat varieties. And to the farmers who make this today. And you don't even know who they are.

Every meal you eat contains ingredients from around the world.

All are so blessed to be able to eat this food and not have to struggle every day.

And I think that's unique from an evolutionary point of view.

This has never happened before.

Enjoy your bread.

Eat it and feel privileged.

thank you very much.

(applause)

So sometimes I get invited to give strange lectures.

I was invited to speak with people who wear large stuffed animal costumes and perform at sporting events.

Unfortunately I couldn't go.

But it got me thinking about the fact that these people, at least most of them, know what they do for a living.

What they do is dress up as stuffed animals and entertain people at sporting events.

Shortly after, I was invited to speak at a convention of balloon animal makers.

And I can't go again. It's a fascinating group. Make animals out of balloons.

There's a big divide between people who make gospel animals and people who make porn animals, but [laughs] they do a lot of really cool stuff with balloons.

It does get into trouble sometimes, but not often.

Another characteristic of them is that they know very well what they do for a living.

Make animals out of balloons.

But what do we do for a living?

What do the people watching this do every day?

And I would argue that what we are doing is going to change everything.

We try to find a part of the status quo—what we care about, what we need to improve on, what we're itching to change—and we change it.

We strive to make big, lasting, and significant changes.

But we don't think so.

And we haven't spent too much time talking about what that process looks like.

And I have been studying it for several years.

I would like to talk about a few things today.

First, about a man named Nathan Winograd.

Nathan was the number two person in the San Francisco SPCA.

What you may not know about the history of the SPCA is that it was set up to kill dogs and cats.

The city gave them a charter to drive out and exterminate stray animals from the streets.

Four million dogs and cats are killed each year, most within 24 hours of being picked up from the street.

Nathan and his boss saw this and couldn't stand it.

So they aimed to make San Francisco a city where killing is prohibited. Create an entire city where all dogs and cats are adopted without being killed unless they are sick or dangerous.

And everyone said it was impossible.

Nathan and his boss went to the city council to ask for an ordinance change.

And people from SPCAs and humanitarian shelters across the country flew to San Francisco to testify against them - claiming it was damaging to the movement and inhumane.

They persisted. And Nathan went straight to the community.

He connected with people who were interested in this: non-professionals, passionate people.

And in just a few years, San Francisco became the first no-kill city to run a deficit with full community support.

Nathan left and went to Tompkins County, New York. It is as different as possible from San Francisco, which is still in the United States. And he did it again.

He has gone from being a glorious dog hunter to completely transforming a community.

And he went to North Carolina and did the same thing again.

And he went to Reno and did the same thing again.

When I think of what Nathan did, and when I think of what the people here have done, I think of ideas.

And I think about the idea that generating ideas, spreading ideas means a lot.

I don't know if you've been to a Jewish wedding, but a Jewish wedding takes a light bulb and breaks it.

Now there are many reasons why and stories about it.

But one reason is that it shows the before and after changes.

It's a moment.

And I would argue that we are living, and we are in, a pivotal moment of change in the way ideas are created, disseminated and implemented.

We started with the idea of ​​a factory that if we had an efficient factory that could create change, we could change the entire world.

Then I moved on to the TV idea that if you had a big enough mouthpiece, you could be on TV enough times, and you could buy enough ads, you could win.

And now we are in this new leadership model. The way to make change is through leadership, not by using money or power to exploit the system.

Now let's talk about the three cycles. The first is the factory cycle.

Henry Ford had a really great idea.

This allowed him to hire a man who was previously paid 50 cents a day and pay him $5 a day.

Because he has a sufficiently efficient factory.

Well, with such advantages, you can produce a lot of cars.

You can make a lot of changes. You can have a road built.

You can change the fabric of an entire country.

The essence of what you're doing is that you need ever cheaper labor and ever faster machines.

And the problem we face is that we are short of both.

Labor cheaper than ever and machines faster than ever.

(Laughter) So we shift gears a bit and say, "I know. TV, advertising. Push-push.

Come up with a good idea and share it with the world.

There are better mousetraps out there.

And if you can get enough money to tell enough people, you sell enough. ”

And an entire industry can be built on top of that.

If you want, you can feature your baby in your ad.

You can also use your baby to sell other things if you want.

And if your baby is not functioning well, you can use a doctor.

But be careful.

Because I don't want the unfortunate juxtaposition of talking about one thing and the other.

(Laughter) In this model, the person at the front of the room is expected to act like a king, such as throwing an object at the peonies at the back.

That you are in charge and you are going to tell people what to do next.

Simply put, you are here and pushing it out into the world.

This method (mass marketing) requires an average idea and a large amount of advertising to reach the masses.

What we've been doing as spammers is hypnotizing everyone, making them buy our ideas, hypnotizing everyone, making them donate to our causes, hypnotizing everyone, making them vote for our candidates.

And unfortunately it doesn't work very well anymore either.

(Laughter) But the good news is right there, really good news.

I call it tribal thinking.

What a tribe is is a very simple concept that goes back 50,000 years.

It's about guiding and connecting people and ideas.

And that's what people have wanted forever.

Many people are used to having spiritual tribes, church tribes, work tribes, and community tribes.

But now, thanks to the internet, thanks to the explosion of mass media, and many other things that flood our societies around the world, tribes are everywhere.

The internet was supposed to homogenize us all by connecting us all.

What is allowed instead is the siloing of interests.

So here is the lady in the red hat.

There's a red hat triathlete over there.

We have an organized army here.

There are chaotic rebels here.

People in white hats are making food.

And those on sailing ships with white hats.

The point is that you can find Ukrainian folk dancers and connect with them. Because you want connection.

Help people on the fringes find each other, connect, and get somewhere.

Any town with a fire brigade understands this concept.

(Laughter) It turned out to be a legitimate non-photoshopped photo.

A firefighter friend of mine told me this was not uncommon.

And what firefighters sometimes do for training is to take homes that are about to be demolished, burn them instead, and practice putting out fires.

But they always stop and take pictures.

(Laughter) You know pirate tribes are fascinating tribes.

they have their own flag. they wear eye patches

You'll know it when you run into someone within your tribe.

And it turns out that it's not money or factories that can change our world, it can change politics, it can unite so many people, it's tribes.

It's not because you forced them to do anything against their will, it's because they wanted the connection.

I think what we do for a living now is to find something worth changing for all of us, spread that idea, gather tribes, gather tribes to spread that idea.

And it becomes something much bigger than us and it becomes a movement.

So when Al Gore tried to change the world again, he didn't do it alone.

And he didn't do it by buying tons of ads.

He did it by creating a movement.

Thousands of people around the country who can make presentations on his behalf. Because he can't be in 100 cities, 200 cities, 500 cities every night.

you don't need everyone.

What Kevin Kelly taught us, I don't know, is that we need a thousand true fans. A thousand people who care enough to take me round after round and round after round.

It means that the ideas you create, the products you create, the movements you create are not for everyone, they are not for the masses. This is not the case.

Instead, the key is to find true believers.

Given what I've said so far, it's easy to say, "Wait a minute, I'm not qualified to be that kind of leader."

So here we have two leaders. they don't have much in common.

they are about the same age. But that's it.

But what they did was each in their own way, creating different ways of navigating the technology.

So some people try to gather people into one team.

And some put people on other teams.

It also helps us make decisions when creating products and services.

As you know, this is one of my favorite devices.

But what a shame that the authors are not organized to help create the movement.

What if, when using your Kindle, you saw comments, quotes, and notes from everyone else reading the same book at that moment?

Or from your book group. Or from friends, or from any circle you want.

What if an author or idea person could use version 2, which goes live on Monday, to organize people who want to talk about something?

There are countless things I can share with you here about mechanics.

But let's try a few.

The Beatles didn't invent teenagers.

They simply decided to lead themselves.

Most of the movement we do, most of our leadership, is about finding groups that are isolated but already have aspirations, not persuading people to want what they don't already have.

When Diane Hutz was working on her video "The Meatrix," which went viral on how to treat livestock, she didn't get the idea of ​​being vegan.

The idea of ​​caring about this issue did not come to her.

But she helped organize people and turn it into a movement.

Hugo Chavez did not create Venezuela's disaffected middle and lower classes. he just led them.

Bob Marley did not invent Rastafarianism.

He just got up and said, "Follow me."

Derek Shivers invented the CD Baby. This gave independent musicians a place where they could sell their music without having to sell it off to men, fulfilling the mission they already wanted and connecting with each other.

What these people have in common is that they are heretics.

The mavericks look at the situation and say, "I can't stand this. I can't stand this."

I am willing to stand up and be counted and want to move things forward.

You can see what the current situation is. i don't like it. "

Instead of seeing all the little rules and following them one by one, instead of me being a so-called shepherd, instead of someone half asleep following instructions, bowing their head and adapting to the situation, sometimes someone stands up and says, "It's not me."

Someone stood up and said, 'This is important.

We need to organize around it. ”

And not everyone does. But not everyone needs it.

All it takes is a few people who see the rules and understand that it's nonsensical and understand how much they want to be connected (laughter).

So Tony Hsieh doesn't run a shoe store.

Zappos is not a shoe store.

Zappos is the one, only, all-time great place where people interested in shoes can find each other, share their passions, and connect with people who care more about customer service than making a dime tomorrow.

It can be as mundane as a shoe or as complex as overthrowing a government.

It works exactly the same.

As Geraldine Carter discovered, all it takes is the ability to say, "I can't do this alone."

But if I can get other people to join my Climb and Ride, we can all get what we want together.

We are just waiting for someone to guide us. ”

Michelle Kaufmann has pioneered a new way of thinking about environmental architecture.

She doesn't do it by silently building one house at a time.

She does it by telling stories to those who want to hear them.

By connecting tribes of people who want to connect with each other.

By leading a movement and making a difference.

And it goes round and round.

So I would like to ask you three questions.

The first is who are you offending?

Because if you're not offending anyone, you're not changing the status quo.

The second question is who are you connected to?

Because for a lot of people, that's what they're going for, building connections with each other.

And third, who are you leading?

Because focusing on the part, the who and the lead, not the mechanics of what you're building, makes the difference.

So Blake from Tom's Shoes came up with a very simple idea.

“What if every time someone bought these shoes, I gave them to someone who didn't have the exact same pair?”

This isn't about how to save shelf space at Neiman Marcus.

It's the story of a product that tells a story.

And as I was walking around in these amazing shoes, someone said, "What is that?"

You can tell the story on behalf of Blake, on behalf of the people who got the shoes.

And suddenly it's not one pair of shoes or a hundred.

Tens of thousands of pairs of shoes.

My friend Red Maxwell has been battling juvenile diabetes for the last ten years.

Instead of fighting the organizations that are fighting it, he fights with them, leads them, connects them, challenges the status quo because it's important to him.

And those around him also need connection.

They need leadership. it makes a difference.

You don't need people's permission to lead them.

But just in case you do, here it is: they're waiting, and we're waiting for you to tell us where to go next.

Here are some common traits of leaders. First of all, they challenge the status quo.

They challenge the present.

The second is building a culture.

A secret word, a 7 second handshake, a way to know if you're in or out.

they are curious Curiosity about people within the tribe, curiosity about outsiders. they are asking questions

They connect people with each other.

Do you know what people want more than anything else?

They want to be missed.

They want you to miss the days they don't show up.

They want to be missed when they are gone.

And tribal leaders can do that.

This is attractive because all tribal leaders have charisma, but you don't need charisma to be a leader.

Being a leader creates charisma.

When you observe and study successful leaders, charisma comes from leaders.

Finally they commit.

they work for the cause. They contribute to the tribe.

They commit to the people there.

So I want you to do something for me.

And I want you to think twice before outright rejecting it.

What I want you to do is done in just 24 hours. It's about making a movement.

important thing. start. Do it. I need it.

thank you very much. I appreciate it

(applause)

I will take you on a trip soon.

To explain that wish, I need you to take me to a place in the world that many people have never been to.

When I was about 24 years old, Kate Stoll and I started an organization to involve architects and designers in humanitarian work, not only in response to natural disasters, but also in institutional issues.

We believe that innovative and sustainable design can make a big difference in people's lives, even where resources and expertise are scarce.

So I started my life as an architect, or trained as an architect, but I was always interested in socially responsible design and how to make a real impact.

But when I was in architecture school, I seemed to be the troublemaker in my family.

Many architects seemed to think that when they designed, they were designing gems, and that they were the gems they strived for and coveted. On the other hand, I felt that when I was designing, I was either improving the community I was designing in, or it was doing me a disservice.

So you're building for the community as a whole, not just for the residents and people who use it.

And in 1999, we started by addressing the housing crisis of returning refugees in Kosovo.

And I didn't know what I was doing - like I said, I was in my mid-twenties - and I'm the internet generation, so I started a website.

So I put out an open call and, to my surprise, within a few months, I had hundreds of submissions from all over the world.

This led to some prototypes and some ideas being experimented with in the wild.

Two years later, we launched a project to develop mobile clinics in sub-Saharan Africa in response to the HIV/AIDS pandemic.

As a result, we received 550 entries from 53 countries.

Designers from all over the world are also participating.

And then there was the exhibition of the work that followed.

2004 was a turning point for us.

We launched a response to natural disasters, launched our engagement with Iran in Bam, and followed up with our activities in Africa.

Working within the United States, most people look at poverty and look at the faces of foreigners.

But I live in Bozeman, Montana. A visit to the Northern Plains of the Reservation, or to pre-Katrina Alabama or Mississippi, could have shown me places far worse off than many developing countries I have visited.

So we participated and worked in the city center and other places. I also plan to participate in a few more projects.

2005: Mother Nature surprises us.

When it comes to natural disasters, you can pretty much guess that 2005 was a scary year.

And thanks to our connections to the internet and blogs and such, we were already raising money, participating, and working with people on the ground, literally within hours of the tsunami.

We work on a few laptops and in the first few days we received 4,000 emails from people needing help.

So we started participating in projects there. I will also talk about other projects.

And, of course, this year we have been following up on Katrina response and recovery efforts.

Here's a quick overview.

In 2004, I couldn't manage the number of people asking for help or the number of requests coming to me.

It all came on my laptop and mobile phone.

So we decided to adopt an open source business model so that anyone, anywhere in the world, could set up a local chapter and participate in local issues.

Because I believe there is no such thing as utopia.

All problems are local. All solutions are local.

I mean someone based in Mississippi knows more about Mississippi than I do.

So what happened was, we used all the Meetups and other internet tools, and ended up having 40 chapters, with thousands of architects in 104 countries.

The point is, sorry, I've never worn a suit and I knew I was going to take this off.

All right, I'll do it soon.

What it has taught me is that the world is getting smaller and there is a grassroots movement of socially responsible designers going on who truly believe that we have an opportunity—an opportunity, not a responsibility—to get serious about making a difference.

(Laughter) (Laughter) Add that to my time.

(Laughter) You don't know, but we have thousands of designers working all over the world, basically connected by a website, and we have a staff of three people.

The fact that no one told us we couldn't do it, we did it.

So there is something to be said about naivety.

Seven years later, we are advocating, inciting, and doing.

We advocate for good design not only through student workshops and lectures, public forums and editorials. We have books on humanitarian work. It also includes disaster mitigation and public policy responses.

We could talk about FEMA, but that's another story.

Agitation, idea development with communities and NGOs, and running open source design competitions.

References, matching with the community.

and implement. I actually go out there and do the work. Because even if you invent it, it will never become a reality until it is built.

Therefore, when trying to design and create change, building that change is very important.

Here are just a few selected projects.

Kosovo.

As I said earlier, we held an open design competition.

And this was not an emergency shelter, but a temporary shelter lasting 5 to 10 years, set up next to the land where the residents lived, and rebuilding their own homes.

This did not impose an architecture on the community. This gave them the tools and space to rebuild and regrow the way they wanted.

It ranged from sublime to ridiculous, but it worked.

This is an inflatable hemp house. it was built;

This is a shipping container.

And there were various ideas, not only architecture, but also governance issues and the idea of ​​forming a community through a complex network.

So we had not only designers, but also various technology-based professionals.

Use the rubble of a collapsed house to build a new one.

Use a straw bail construction to create a thermal wall.

Then in 1999 something amazing happened.

We originally went to Africa to investigate housing issues.

Within 3 days, we knew the problem was not housing. The HIV/AIDS pandemic was expanding.

And it wasn't the doctor who told us this. We were with actual villagers.

So we had the brilliant idea that instead of making people walk 10-15 kilometers to see a doctor, we could get a doctor to them.

And then we started getting involved with the medical community, and you know, we thought it was a really bright spark – “We came up with this brilliant idea: mobile clinics that are widely distributed throughout Sub-Saharan Africa.”

And the medical community there said, "We've been saying this for the last 10 years.

we know this I just don't know how to show this. ”

So, in a way, we took an existing need and offered a solution.

And again, different ideas came out.

This is my personal favorite. Because the idea is that architecture is not just a solution, it is about raising awareness.

Kenaf Clinic.

If you get a seed and grow it in the ground, it will grow up to 14 feet in a month.

And in the fourth week the doctors come, mow the area, put a tension structure on it, and when they finish treating and examining the patients and the villagers, they cut down the clinic and eat it.

So it addresses the fact that if you have AIDS, you also need nutritional support, and the nutrition mindset is just as important as getting antiretroviral drugs out there.

So this is a serious solution.

this is what i love.

It looks at establishing trade routes and economic engines within the community and can be a self-sustaining project.

All of these projects are sustainable.

It's not because I'm a green human being in a tree.

Because living on $4 a day means living in survival and it has to be sustainable.

You need to understand where your energy is coming from, where your resources are coming from, and minimize maintenance.

This is to get the economic powerhouse, and at night it turns into a movie theater.

This is not an AIDS clinic. It's a community center.

Then you can see the idea.

These ideas then evolved into prototypes that were eventually built.

And now, as of this year, clinics are rolling out in Nigeria and Kenya.

From there we also developed Siyathemba.

The community came to us and said, 'The problem is that the girls are not educated.'

And in the regions where we work, HIV/AIDS prevalence among young women aged 16-24 is 50 percent.

It's not because they're indiscriminate, it's because they're ignorant.

So we turned to the concept of sport and decided to set up a youth sports center that doubles as an HIV/AIDS support center. The women's team coach was also a trained doctor.

That's why it takes a very slow way to build trust in medicine.

Nine finalists were then selected, the nine finalists were distributed throughout the region, and the community chose the design.

They said this is our design because it's not just about getting the community involved. It is about empowering communities and getting them involved in the rebuilding process.

So here is the winning design.

And of course, we actually work with communities and clients.

So this person is a designer.

And they can communicate it better.

(singing a cappella in South African language) Video: Hi my name is Cee Cee Mkhonza.

I work at the Africa Center and am an IT User Consultant.

My name is Banyana Banyana and I am also a South African football player.

And I also play for a team in the Vodacom league called Tembisa, which has now changed to Siyathemba.

This is our home ground.

Cameron Sinclair: I'm running out of time, so I'll get to that later.

I see Chris looking at me slyly.

This was a chance meeting with someone who wanted to develop Africa's first telemedicine center in Tanzania.

And we literally met months ago.

The team is there, working collaboratively.

This was made possible thanks to a few TEDsters such as Sun (Microsystems), Cheryl Heller and Andrew Zori who connected me with this amazing African woman.

It will begin construction in June and will be opened by TEDGlobal.

Check it out when you're at TEDGlobal.

But what we are probably best known for is dealing with disasters and development, and has been involved in many issues such as the tsunami and Hurricane Katrina.

This is a $370 shelter that is easy to assemble.

This is a community center organized by the community.

What that means is that we actually live in and work with communities, and communities are part of the design process.

Children actually participate in planning where the community center should be located.

Ultimately, the community builds with us through skill training.

This is another school.

This is what the UN gave them for 6 months - 12 plastic tarps.

This was in August.

This was the replacement. It should last 2 years.

You can't hear anything when it rains and in the summer it's about 140 degrees indoors.

So we said, let's get some fresh water when it rains.

Therefore, every school has a rainwater collection system.

Very low cost. It has three classrooms and costs $5,000 to collect rainwater.

This was boosted by hot chocolate sales in Atlanta.

made by the children's parents.

Children go out to the site and build buildings.

The school opened a few weeks ago and is currently serving 600 children.

(Applause.) Then disaster hit our home.

We see bad stories on CNN, FOX, etc., but we don't see good stories.

There is a community gathered here. They said "no" to waiting.

They formed a partnership, a diverse partnership of players, to actually map East Biloxi and figure out who was involved.

To date, we have helped more than 1,500 volunteers rebuild and rehabilitate their homes.

Understand what FEMA regulations are. Don't wait to be told how to rebuild.

Work with residents to keep them out of their homes so they don't get sick.

This is what they are cleaning themselves.

to design a house;

Renovated house completed in 4 days.

This is a utility room for women who use walkers.

she is 70 years old. This is what FEMA gave her.

$600, two days ago.

I assembled the bathroom very quickly.

It's built and running and she just started a business today where she washes other people's clothes.

These are Calhouns.

They are photographers who have documented Shimokudo over the past 40 years.

That's their house and this is the picture they took.

And we are working with them to help build new buildings.

a project we did.

Why don't aid agencies do this?

This is the new UN tent that was just introduced this year.

Fast to assemble.

It took 20 years to design and implement it in the field.

i was 12 years old.

Fortunately, we are not alone.

Hundreds of architects, designers and inventors around the world participate in humanitarian work.

Let's build more hemp houses -- that seems to be a theme in Japan as well.

I don't know what they are smoking.

(laughter) This is a grip clip. It was designed by someone who said, "All you need is some way to attach the membrane structure to a physical support beam."

Designed for NASA, this guy now works in housing.

I only have a few minutes, so I'll finish it quickly.

So all this has been completed in the last two years.

I was shown what took 20 years.

This is just a fraction of what has been built in the last few years.

From Brazil to India, Mexico, Alabama, China, Israel, Palestine and Vietnam.

The average age of the designers working on this project is 32, and I am around that age.

So this is youth. I must stop here. Because Arup is in the room. And this is the best designed toilet in the world.

(laughter) Chris Luebkeman tells you why.

I'm sure he wanted to spend the party that way.

But the future isn't New York skyscrapers, it's this.

I see so many inventors.

One billion people live in extreme poverty.

we hear about them a lot.

Four billion people live in a growing but fragile economy.

1 in 7 live in unplanned settlements.

In 20 years, 1 in 3 people will be living in unplanned settlements or refugee camps if nothing is done about the impending housing crisis.

How can we improve the living standards of 5 billion people?

10 million solutions.

So I want to develop a community that embraces innovative and sustainable design and improves living conditions for all.

Chris Anderson: Hold on -- is that what you want?

CS: That's my wish.

CA: That's what he wants!

(Applause) CS: We started Architecture for Humanity with $700 and a website.

So Chris somehow decided to give me 100,000.

So why aren't there more people like this?

Open source architecture is the way to go.

We have a diverse community of attendees, talking not only about inventors and designers, but also about funding models.

My role is not a designer. It is a conduit between the world of design and the world of humanitarianism.

And what we need is something that reproduces me all over the world. Because I haven't slept in seven years.

(Laughter) Then what about this?

Designers want to address the issue of humanitarian crises, but they don't want Western companies to adopt their ideas and basically profit from them.

So Creative Commons developed the Developing Countries License.

What that means is that designers can: My Siyathemba project was the first building to receive a Creative Commons license.

As soon as it is built, anyone in Africa or any developing country will be able to obtain the construction documents and reproduce them for free.

(Applause.) So why not give designers a chance to do this, but protect their rights here?

We want to create a community where you can upload your ideas and test them in earthquakes, floods, and all kinds of harsh environments.

The reason that's important is because I don't want to wait until the next Katrina to see if the house works.

It's too late, we must do it now.

So I want to do this globally and have this whole thing work in multiple languages.

When most people think of an architect's face, they think of a white man with white hair.

I don't understand it. I can see the face of the world.

Therefore, we want everyone on the planet to be able to participate in this design and development.

Need-Based Contest Ideas -- Give the remaining 98 percent an XPRIZE, if you like to call it that.

We also want to explore ways to connect matching and funding partners, as well as the idea of ​​integrating manufacturers, ie fab labs in different countries.

Every designer in the world is going to be educated when they hear that a $100 laptop is going to educate every kid.

Place one in every shantytown, every shantytown.

'Cause you know something, right? Innovation will happen.

And I need to know that. It's called leapback.

We talk about leapfrog technology.

I write for Worldchanging, and one of the things we've talked about is that we learn a lot more in the field than we learn here.

So let's take these ideas, adapt them, and use them.

These ideas should be adaptable. They should have the potential to evolve. They should be developed by and useful to all nations of the world.

There should be a sheet.

I don't have time to read this, because I will be withdrawn.

CA: Let's just leave it alone.

CS: Well, what would that take? You guys are smart.

Therefore, it requires a large amount of computing power. Because we need the idea that any laptop in the world can connect to the system and participate in the development of these designs as well as utilize them.

I want every Arup engineer in the world to see if we are doing a good job. Because they are the best in the world.

plug.

So, you know, I want these, but be careful. I have two laptops, one of which has 3000 designs.

It is therefore important to publish these proven ideas in a form that is easy to use and accessible.

(Laughter) I'm tired of talking about making a difference.

Only by doing it will you succeed.

Changed FEMA guidelines. We changed public policy. We have changed our international response based on building things.

So for me, it's important to create a real pipeline for innovation and that it's free innovation.

Think about free culture. This is free innovation.

Someone said this a few years ago.

I will give you points if you know.

But I think this guy was probably 25 years too early.

So let's do it.

(applause)

(Applause.) AIDS was discovered in 1981. Virus, 1983.

These Gapminder bubbles show how the virus spread around the world in 1983, or how we estimated it.

What we are showing here is showing the percentage of infected adults on this axis.

And on this axis, we show per capita income in dollars.

And the size of these bubbles, the size of the bubble here, is the number of infected people in each country, and the color is the continent.

Here you can see that the U.S. had a very low infection rate in 1983, but still had a sizeable bubble because of its large population.

There are quite a few infected people in America.

And you can see Uganda there.

At that time, the number of infected people was close to 5%, and despite being a small country, there was a fairly large bubble.

And they were probably the most infected countries in the world.

Well what happened?

I think I understand the graph. Replay the global HIV epidemic in the next 60 seconds.

First of all, here's a new invention.

(Laughter) I solidified the laser pointer beam.

(Laughter.) (Applause.) Alright, ready, solid, let's go!

First, the rapid rise of Uganda and Zimbabwe.

It went up like this.

Thailand was the first Asian country with the highest number of cases, with an infection rate of 1-2%.

Uganda then began to retreat, while Zimbabwe surged, and a few years later South Africa experienced a terrifying rise in HIV cases.

In India, there were many infected people, but the level was low.

And much the same thing happens here.

Uganda has collapsed, Zimbabwe has collapsed, and Russia has become one percent.

In the past few years, the global HIV epidemic has reached a steady state.

It took 25 years.

However, steady state does not mean that things are getting better, just that they have stopped getting worse.

And at steady state, more or less, 1 percent of the world's adult population is infected with HIV.

That means all of California, 30 to 40 million people. That is, all people, more or less the equivalent of today's world population.

Now let's do a quick replay of Botswana.

Botswana -- an upper middle income country in southern Africa, a democratic government, a good economy, and this is what happened there.

Low at first, it rose sharply, peaked in 2003, and is now falling.

However, they are slowly declining as Botswana has a good economy and governance and manages to treat its people.

And if infected people get treatment, they don't die from AIDS.

Humans can live 10 to 20 years, so this percentage won't go down.

Therefore, these indicators currently have some problems.

But in the poorer countries of Africa, the low-income countries here, people are still dying, so the decline in infection rates is happening faster.

Despite the generous PEPFAR, not everyone has access to treatment, and in poorer countries only 60 per cent of those who do have access to treatment after two years.

Lifetime care for everyone in the poorest countries is unrealistic.

But what is being done is very good.

But now there is a renewed focus on prevention.

The world can only deal with it by stopping the transmission.

The drugs are too expensive – they would have been more effective if there was a vaccine, or when one could be obtained – but the drugs are very expensive for the poor.

It is not the drug itself, but the treatment and care that is needed around it.

One thing is very clear when looking at the patterns. You can see blue bubbles. HIV prevalence is said to be very high in Africa.

In Africa, HIV is very different.

You can see that African countries have the highest rates of HIV infection in the world, and Senegal here has the same rate as the United States.

There is also Madagascar, and there are many African countries that are almost as low as the rest of the world.

It's a terrifying simplification that Africa is one and things go one way in Africa.

you have to stop it.

That's not respectful, and it's not very wise to think of it that way.

(Applause.) I was fortunate enough to live and work in the United States for a while.

It turns out that Salt Lake City and San Francisco are different.

(Laughter) And it's the same in Africa, with a big difference.

So why is it so expensive? War?

No, it's not. Look at this.

The war-torn Congo is below that, at 2, 3 and 4 percent.

And this is peaceful neighbor Zambia - 15 percent.

And there are good studies on refugees coming out of Congo, with 2-3 percent infected, and much higher in peaceful Zambia.

There are now studies that clearly show that war is bad, rape is bad, but this is not the driving force at high levels in Africa.

So is it poverty?

At the macro level, it seems like more money and more HIV.

But it's pretty simple, so let's turn to Tanzania.

Let's divide Tanzania into five income groups, from highest income to lowest income.

The highest earners are not wealthier, but they are more likely to be infected with HIV.

The difference decreased from 11 percent to 4 percent and is even greater for women.

There are many things we thought the excellent research done by African institutions and researchers with international researchers had shown otherwise.

This is the difference within Tanzania.

And showing Kenya is inevitable.

Look at Kenya here.

I have divided Kenya into states.

Come on, let's go.

Look at the differences within one African country. It ranges from very low to very high levels and most states in Kenya are very modest.

So what is it?

Why do we see such extremely high levels in some countries?

Well, it's more common with multiple partners, less condom use, and sex regardless of age. That is, older men tend to have sex with younger women.

In many of these severely affected countries, young women are found to be more affected than young men.

But where are they?

Replace the bubble with a map.

Highly infected people make up 4 percent of the population and account for 50 percent of those living with HIV.

HIV exists worldwide.

Look, we have bubbles all over the world here.

Brazil has a large number of HIV-infected people.

Arab countries are not so much, but Iran is quite high.

They are addicted to heroin and are also prostitutes in Iran.

There are many, because there are many in India.

such as Southeast Asia.

But there are parts of Africa. And it's also difficult not to make sweeping statements about Africa, and on the one hand not come up with simple ideas about why Africa is the way it is.

On the one hand, there is now scientific consensus about this pattern, so try to say that this is not the case.

UNAIDS finally has good data on the spread of HIV.

It could be concurrency.

It could be some kind of virus.

There could be something else causing transmissions at higher frequencies.

After all, if you're perfectly healthy and have heterosexual sex, your risk of getting infected in a single intercourse is 1 in 1,000.

Don't jump to conclusions right now about how you will act tonight.

(Laughter) But if you're at a disadvantage, like a sexually transmitted disease, you have a 1 in 100 chance of contracting it.

But what we are thinking is that it could be concurrency.

And what is concurrency?

There is no concurrency in Sweden.

We are serial monogamous.

Vodka, New Year's Eve -- Spring's new partner.

Vodka, Midsummer's Eve -- Autumn's new partner.

Vodka -- and it goes on like this, you see?

And you collect tons of ex-lovers.

And we have a dreaded chlamydia epidemic. The dreaded chlamydia epidemic has been going on for years.

HIV infection peaks three to six weeks after infection, so having multiple partners in the same month is much more dangerous for HIV than other partners.

I think it's probably a combination of these.

And what makes me so happy is that, looking at this, we are now heading towards the facts.

This chart is available free of charge.

Uploaded UNAIDS data to Gapminder site.

And we hope that in the future, we will be able to use not only hearts and money, but also brains when tackling global problems.

thank you very much.

(applause)

There was a time when simple infections were fatal, but now with the widespread availability of antibiotics, they are simply a relic of the past.

But really, I should say "was". Because we overuse antibiotics today, the bacteria that cause these infections are becoming resistant.

And that should really scare us all.

If we don't change our behavior and wean off antibiotics, the United Nations predicts that antibiotic resistance will be our number one killer by 2050.

Therefore, we must begin to act.

But since we humans aren't the only ones using antibiotics, 'where to start' is an interesting question.

Worldwide, 50-80% of all antibiotics are used in animals.

Not all of these are important to human health, but if not controlled now, they have a very dire future for both humans and animals.

First, let's talk about how we got here.

The first large-scale use of antibiotics was in the early 1950s of the last century.

As the Western world grew more prosperous, people wanted more animal protein.

When animals get sick, they can now be treated with antibiotics so they don't die and continue to grow.

But it soon became apparent that adding small doses of antibiotics to their feed regularly kept animals healthy, growing faster and requiring less feed.

So these antibiotics worked well, really worked really well.

And with the increase in animal production, the use of antibiotics has also surged around the world.

Unfortunately, so did antibiotic resistance.

The reason doctors tell you to finish a bottle of antibiotics is that you can't kill all the worms if you reduce the dose.

And what sticks there builds up antibiotic resistance.

This is the same problem with administering small doses of antibiotics to animals on a regular basis. Some bad bugs die, but not all.

Spread it across the industry and they'll understand how we're inadvertently building a large reservoir of antibiotic-resistant bacteria.

But I hate to confide this in you. That's not the only problem.

Do you know who else is taking antibiotics?

Fluffy the cat and Rover the dog.

(Laughter) Pets rank among the heaviest users of all animals and use antibiotics, which are by far the most important to human health.

Considering how close we live with our companion animals, we understand the risk of catching antibiotic-resistant bacteria from our pets.

But how do these antibiotic-resistant bacteria in livestock affect you?

Let me give you an example with real data.

Levels of antibiotic-resistant Salmonella in European swine to various types of antibiotics range from less than 1 percent to as high as 60 percent.

This means that in most cases this antibiotic is no longer effective in killing salmonella.

And there was a high correlation between antibiotic-resistant Salmonella in pigs and finished products.

Be it pork chops, spare ribs or minced meat.

Fortunately, all raw meat, fish and eggs typically contain less than 1% salmonella.

And this poses a risk only if not properly treated.

Still, there are over 100,000 human salmonella infections in the EU and over 1 million in the US.

There are 23,000 hospitalizations and 450 deaths in the United States each year.

This death toll is likely to rise further as antibiotic-resistant salmonella is on the rise.

But it's not just about consuming yourself.

This year, more than 100 people contracted multidrug-resistant salmonella after feeding their dogs pig ears as treats.

So we really have to reduce the use of antibiotics in animal production.

And luckily this is starting to happen.

The EU became the first region to ban the use of low-dose antibiotics in feed.

Since 1999, in several steps, the amount of different types of antibiotics allowed has been reduced, and in 2006 a total ban was implemented.

Administration of antibiotics was permitted only if the veterinarian determined that the animal was ill.

It is wonderful.

Problem solved.

No, wait, it's not that early.

As soon as the curtailment program was launched, it quickly turned out that antibiotics were the perfect blanket to hide many bad farm practices.

More and more animals became sick and had to be treated with antibiotics.

In other words, the total amount increased rather than decreased.

It certainly wasn't the way to go.

Fortunately, the story didn't end there.

The entire European agricultural sector has started its journey. And I think it's a journey that everyone can learn from.

It was also the time when I myself entered this scene.

I joined a major European feed compounding company.

Feed formulators create comprehensive diets for farmers to feed their animals and also provide advice on how to best feed the animals.

I was really motivated to work with my colleagues, veterinarians and of course farmers to find ways to keep animals healthy without the use of antibiotics.

Three major things are required for antibiotic-free production.

Let's talk about playbooks.

First, as it may sound very obvious, our hygiene is the starting point.

Improved cleaning of stables and drinking water lines, making disease less likely to enter and spread within stables.

It's all very important, but what I was personally most interested in was better food for animals, better nutrition.

It is important to give them a balanced diet.

Think of it this way. If you don't get enough fiber yourself, you'll feel sick.

Some of the ingested food is not digested on its own but is fermented by bacteria in the large intestine.

In other words, you are feeding a portion of your diet to the microbes.

Initially, most young animals were fed a very finely ground, highly digestible diet that was low in fibre, high in starch and protein.

It's like being yourself on a diet of hamburger buns, rice, waffles, and protein bars.

We changed this to a low-protein, high-fiber, grainy type of diet.

I'm on a diet like eating whole grains, meat and bean salads.

This shifted the animal's intestinal flora to a more beneficial one, reducing the potential for pathogens to spread.

It may surprise you, but not only the composition of your diet, but also the structure of your diet plays an important role.

The mere fact that the same diet is coarser makes the digestive tract more developed and therefore the animal healthier.

But the best part is that farmers have actually started buying it too.

Unlike other parts of the world, farmers in Western Europe still make largely independent purchasing decisions about who to buy feed from and to whom to sell animals.

In the end, what we actually sell reflects the actual local needs of our farmers.

For example, in countries that are very committed to reducing antibiotics, such as Germany and the Netherlands, the amount of protein in piglet diets is already 10-15 percent lower than in countries like the UK.

However, like good hygiene, good nutrition helps but does not completely prevent disease.

Therefore, more is needed.

That's why we focused on the microbiome.

Making feed-bearing waters more acidic benefits more beneficial bacteria and helps create a pathogen-inhibiting environment.

As with fermented foods, yogurt, sauerkraut, salami, etc., are all less perishable.

Now, using modern technology, such as those based on DNA testing, we know that there are many more different microbes out there.

And this ecosystem, which we call the microbiome, is much more complex.

It was found that there are approximately eight times more microorganisms in the intestine than there are tissue cells in the body.

And animals are affected too.

Therefore, if we want to work without antibiotics in animal production, we have to make the animals tougher.

Therefore, animals are more resilient when disease strikes.

And this three-dimensional nutritional biology approach, which includes host, nutrition, and microbiome, is how we do it.

Currently, feeding animals on feeds that contain or induce antibiotic use is a little cheaper at the farm level.

But in the end, at the consumer level, it's all about a few percent.

This is actually quite affordable for the middle- and upper-income segments of the world's population.

And there is very little price to pay when our own or our loved ones' health is in jeopardy.

So what do you think, what direction are we going?

Will we allow antimicrobial resistance to become our number one killer, at great financial and extraordinary personal cost?

Or will we start embracing the production of truly antibiotic-free animals, rather than just reducing human antibiotic consumption?

For me the choice is very clear.

But to do this, we need to set reduction targets and ensure that they are adhered to around the world.

Because farmers are competing with each other.

And at the national level, trading blocs or global markets, costs matter a lot.

Also, be realistic.

To achieve this reduction, farmers need better management and the potential to invest more in better feed.

Besides legal restrictions, the market can also play a role by offering reduced or antibiotic-free products.

And as consumer awareness grows, these market forces will grow.

Everything I've been talking about now sounds great to us.

But what about animals?

Well, their lives are getting better, too.

Better health, less stress, happier life.

So I understand now.

We know how to produce meat, eggs and milk without or with very little antibiotics. I would argue that it is a small price to pay to avoid a future where bacterial infections are once again our number one killer.

thank you.

(applause)

Over the last few years we have been calling out to men.

it had to be done.

(Applause.) But these days, I think we need to do something harder.

As my best friend Tony Porter says, we have to find a way to attract men.

My father started sexually abusing me when I was 5 years old.

He came to my room in the middle of the night.

He seemed to be in a trance.

The abuse continued until I was ten years old.

When I tried to resist him, when I was finally able to refuse, he started beating me.

he called me stupid

He said I was a liar.

The sexual abuse ended when I was 10, but it never really ended.

It changed who I am.

I was filled with anxiety and guilt and shame all the time, but I didn't know why.

I hated my body, I hated myself, I often got sick, I couldn't think, I couldn't remember things.

I was attracted to the dangerous men and women who allowed me to be mistreated, in fact I invited them. Because that's what my dad taught me that love is like that.

I waited my whole life for my father to apologize to me.

he didn't.

he didn't.

And as the recent scandals of high-profile men unfolded, I realized something. I have never heard of a man who has committed rape or physical violence publicly apologized to his victim.

I began to wonder what a genuine and deep apology would look like.

So something strange started happening.

As I began to write, my father's voice began to come through me.

He started telling me what he did and why.

he started apologizing.

It's been almost 31 years since my father passed away, and in this apology I had to write on his behalf, I discovered the power of apology and how it can actually be a way forward in the crisis men and all the women who are being abused by them are currently facing.

An apology is a sacred promise.

It requires complete honesty.

It requires deep self-inquiry and time.

You can't rush.

It turns out there are four steps to an apology. If you don't mind, I'd be happy to walk you through the steps.

First, you must spell out what you did.

Accounting cannot be obscured.

"I'm sorry if I hurt you" or "I'm sorry if I sexually abuse you" are no good.

I have to say what really happened.

"I came into your room in the middle of the night and pulled your pants down."

"I despised you because I was jealous of you and wanted you to feel more."

Liberation is in the details.

To apologize is to remember.

It connects the past with the present.

It is written that what happened actually happened.

The second step is to ask yourself why.

Survivors are haunted by the reason.

why? Why would a father try to sexually abuse his eldest daughter?

Why is he grabbing my head and banging it against the wall?

In my father's case, he was born much later than his other children.

For him, chance became a "miracle."

He was worshiped and treated as a Golden Boy.

But it turns out that worship is not love.

Worship is the projection of someone's desire for you to be perfect.

My father was never allowed to be who he was because he had to live up to this impossible ideal.

He was never allowed to express tenderness or weakness, curiosity or doubt.

He was never allowed to cry.

So he was forced to push all those feelings underground and eventually metastasized.

Repressed emotions later became Shadowman, spiraling out of control and finally unleashing a torrent on me.

The third step is to be open and feel what the victim felt when you were abusing her.

You have to break your heart.

We have to feel the long-term effects of fear, betrayal, and abuse on victims.

You have to accept the suffering you have caused.

And, of course, the fourth step is to take responsibility and make amends for your actions.

So why would anyone want to go through such a grueling and humbling process?

why would you want to tear yourself apart?

Because it's the only thing that will set you free.

That's the only way to free the victim.

You didn't just destroy the victim.

No one who inflicts violence on others does not suffer its effects himself.

It creates an incredibly dark and tainted psyche that permeates your entire life.

The apology I wrote -- I learned something about the different perspectives we must look at to understand the issues of male violence that I and a billion other women have survived.

We often seek punishment first.

This is our first instinct, but the truth is that while punishment can be effective, it is not enough.

my father punished me

I was shut down and broke.

We think punishment hardens us, but it doesn't tell us.

Humiliation is not a revelation.

We really need to create a process that can involve punishment. It opens the door for men to actually be something or someone else.

For years I hated my father.

i wanted him dead I wanted him in jail.

But in reality, that anger kept me connected to my father's story.

All I really wanted was more than just getting my father to stop.

I wanted him to change.

I wanted him to apologize.

that's what we want.

We don't want men to be ruined, we don't just want them to be punished.

We want them to see us, the victims of what they have hurt, and repent and change.

And I actually believe it is possible.

And I truly believe that's the way we should go.

But the participation of men is also necessary.

We need men to have the courage to join this transformation now.

I've spent most of my life calling out men, and now I'm here to call you out.

thank you.

(Applause.) Thank you.

(Applause.) Thank you, thank you.

(applause)

Ethic, Hedge, and Revolutionary leader Adira plot a way to steal an artifact called the Node of Power.

It is used to run heavily fortified trains across the country, supplying settlements and establishments.

This massive armored vehicle undergoes a complex and unpredictable unloading procedure. The procedure is detailed on the screen inside the engine car.

Right means the train moves forward one car length, left means the train moves back the same distance.

During unloading, trains often move back and forth, so a typical sequence would be:

In addition, there is a button in the engine car that can only be pressed once.

Press to lower a force field onto the artifact for 10 seconds.

Engine cars are small and designed for robots.

Only hedges can fit in your team.

Members of the Resistance set up cranes over the tracks so that they could pick off the artifacts when they were exposed.

They can visually know when to lower the crane.

But the only way the hedge can determine the position of the train and know when to lower the force field is by analyzing the unloading procedure. Because he will be in an engine car with no windows.

However, since Hedge can't program himself, it's up to his ethics to tell him what to do.

The artifact is on the vehicle 10 positions behind the vehicle that was directly under the crane when it started.

What instructions could Ethic give Hedge to press the button at the right time?

Here are some tips to get you started.

The key to this problem, like many programming challenges, is to reconstruct information in a way that computers can process it.

The computer doesn't know what a train is, nor does it need to know.

However, you can use variables.

Let's create a variable to track the position of the train.

How does it change when the train moves?

Let's break this problem down into two parts.

The first is knowing where the train is when it executes the instructions.

The second is to press the button when the train is in the right position.

For the first purpose, it helps to think of the train as a big number line.

Let's make the car with the node 0, the car before it 1, and so on.

So car #10 is under the crane at the start.

When the train moves one car to the right, car No. 9 is under the crane.

So you can think of the right arrow as "minus one". From there when the train moves left, 10 goes back under the crane and the left arrow is the same as "add 1".

Let's set the train position variable to 10 to start from there.

Now you can use a loop to read the instructions one by one, adding or removing them while keeping track of which vehicles are under the crane.

Setting the variable this way has the advantage of knowing how far the node is from the crane.

So as soon as the variable reaches 0, the Hedge should press the button.

And this happens.

Ethick takes the position of the crane and Hedge hurries off, slipping unnoticed into the engine car just before the train begins to move.

Back up 3 cars. 1 forward, 4 backs.

After that, the hitherto advancing Ethic loses track and then retreats again.

When the artifact finally rolls into place, Adira lowers the crane while praying that Ethic and Hedge have judged correctly.

At the last moment, the force field splashes and falls.

Ethics swoop in and lift the knot of power to freedom.

When Ethic gives the node to Hedge for safekeeping, the unbelievable happens.

This artifact comes to life with visions of the past. When the crystal was unearthed, no one could get the console inside to work.

The government called on people to try their luck one at a time.

Ms. Esik signed up because she liked to understand what makes things work.

As soon as she accessed the console, something clicked into place and she created her first robot.

The government hired Eshik as the chief robotics engineer on the spot.

Within a year, her work had permeated nearly every aspect of society, and nations and peoples were prospering without the need to work in fields or factories.

The vision ends and Hedge detects a second artifact southeast of 198 Woods.

Luckily, the train is going there next and we have just enough spare fuel for the trip.

Ethick and Hedge secretly board the ship to find a hiding place for the long journey ahead.

♫ I think I'm ready to do what I'm supposed to do ♫ ♫ I think I'm ready to take a chance ♫ ♫ Eating out is stressful ♫ ♫ Because of this situation. look? ♫ ♫ Gotta get up, get up, get up, get up ♫ ♫ Get up, get up, get up, get up ♫ ♫ I know what you're talking about ♫ ♫ I sent the demo out into the world and they said it's like Take 6 ♫ ♫ I said 'Wait a minute, wait a minute, I'll be back with a remix' ♫ ♫ They're looking at us funny, we can't make money ♫ ♫ Me It took us years to understand that we were dealing with dummies ♫ ♫ They didn't understand the sound from the Bronx, that's a boogie down ♫ ♫ Went to Huntsville, Alabama, and my planner didn't have circles ♫ ♫ It was time to make a product, so I got in touch with Townsend ♫ ♫ We made a deal with John Neil on the street and sold 10,000 units ♫ ♫ The WBA, which means a trip to Nashville ♫ ♫ Festplatte appeared and said they were natural ♫ ♫ Can you hear what they were hearing? Did you see what they were seeing? ♫ ♫ We toured Europe from the Bronx to Berlin ♫ ♫ All-vocals, yes we Widdit, named the album 'What is it?'. ♫ ♫ Together with Sarah Connor, we set a number one goal and we achieved it ♫ ♫ But now it's Kev, Sim, Drew, Stew, it's time for a new day ♫ ♫ Ring the alarm and contact us via Skype or two ways ♫ ♫ Sung by the lyrics, we're ready to fly! ♫ ♫ Fly Baby! It's time to leave the nest ♫ ♫ Fly baby! It's not the time to rest ♫ ♫ Come fly, baby, we've got work to do ♫ ♫ Now spread your wings... ♫ ♫ Fly baby! It's time to leave the nest ♫ ♫ Fly baby! Not when resting. Come on, ♫ ♫ Fly baby! I have work to do ♫ ♫ Let's go. Spread your wings and fly. Again ♫ ♫ Fly baby! It's time to leave the nest ♫ ♫ Fly baby! It's not the time to rest ♫ ♫ Fly Baby! I've got work to do ♫ ♫ Now spread your wings... ♫ ♫ Fly away baby! Fly baby fly ♫ ♫ Fly baby! Fly baby high ♫ Fly baby! Up to the sky ♫ ♫ Spread your wings and fly ♫ Instrumental!

♫ We are ready to go! ♫ (Applause) Thank you.

(applause)

Let's talk about India through the evolution of ideas.

I believe this is an interesting take. Because in any society, especially in an open democracy, things change only when ideas take root.

Ideas gradually lead to ideology, to policy, to action.

In 1930 the country experienced the Great Depression, which gave rise to all the ideas about the state and social security, and everything else that happened in Roosevelt's time.

Deregulation began in the 1980s with the Reagan Revolution.

And today, after the global economic crisis, a whole new set of rules has been set for how states should intervene.

Ideas therefore change state.

And I looked at India and said there are four kinds of ideas that really impact India.

The first is what I call "arrived ideas".

These ideas came together to make India what it is today.

The second set of ideas I call "ideas in progress."

These are ideas that have been accepted but not yet implemented.

The third idea is what I call the "discussed idea." These are battles of ideas, ideologies that we fight over how to do things.

And the fourth, and I think this is the most important, is "ideas that should be taken in advance."

Because if you are in the developing world of the world and you can see the problems other countries have, you can predict what they actually did and act in a completely different way.

Now, for India, I believe there are six ideas responsible for today's situation.

The first is actually the concept of people.

In the 60's and 70's we thought of people as a burden.

We thought people were responsible.

Today we are going to talk about people being assets.

We speak of people as human capital.

And I believe this shift in mindset of seeing people as a burden on human capital is one of the fundamental shifts in the mindset of Indians.

And this shift in thinking about human capital is linked to the fact that India is experiencing a demographic bonus.

As health care improves and infant mortality falls, fertility rates will begin to decline. And India is experiencing it.

Over the next 30 years, India will have more young people due to its demographic dividend.

What makes this demographic dividend unique is that India will be the only country in the world to enjoy this demographic dividend.

In other words, it will be the only young country in the world with an aging population.

And this is very important. At the same time, if we strip away India's demographic bonus, we actually have two demographic curves.

One is the southern and western part of India, which will already be fully funded by 2015 as the fertility rate in this part of India is about the same as in Western European countries.

Moreover, northern India as a whole will account for the bulk of the future demographic bonus.

But demographic dividends are just as effective as investments in human capital.

Only if people are educated, healthy, have good infrastructure, have roads to get to work, and have lights to study at night can they really get the benefits of the demographic bonus.

In other words, without serious investment in human capital, the same demographic dividend can lead to demographic disaster.

India is therefore at a critical juncture as to whether it can capitalize on its demographic bonus or it will lead to a demographic disaster.

The second change in India is the changing role of entrepreneurs.

When India became independent, entrepreneurs were seen as the bad guys, the exploiters.

But today, 60 years later, with the rise of entrepreneurship, entrepreneurs have become role models and are making significant contributions to society.

This change has contributed to the vitality and the economy as a whole.

The third big thing that I think has changed India is our attitude towards the English language.

English was considered the language of the imperialists.

But today, due to globalization and outsourcing, English has become a dream language.

This has made it something that everyone wants to learn.

And the fact that you can use English is now becoming a big strategic asset.

Next is technology.

Forty years ago, computers were seen as forbidden, intimidating and work-reducing.

Today, we live in a country that sells 8 million cell phones a month, but 90 percent of those cell phones are prepaid because people have no credit history.

40% of these prepaid phones cost less than 20 cents per recharge.

It is the scale that technology has unlocked and made accessible.

Thus, technology has gone from being seen as prohibitive and intimidating to being empowering.

Twenty years ago, when there was a report on bank digitization, the bank didn't call it a computer report, it called it a "book transfer machine."

They didn't want the unions to believe they were actually computers.

And when they needed a more advanced and powerful computer, they called it an "advanced book-transcription machine."

In short, we have come a long way since the days when the phone became an empowering tool and changed the way Indians thought about technology.

And I think another point is that Indians today are much more accustomed to globalization.

Again, having lived under imperial rule with the East India Company for over 200 years, Indians had a very natural reaction to globalization, believing it to be a form of imperialism.

But today, as Indian companies go abroad and Indians come and work all over the world, Indians are becoming more confident and aware that globalization is something they can participate in.

And since India is the only young country in the world with an aging population, the fact that demographics favor India makes globalization all the more attractive to Indians.

And finally, India deepened its democracy.

When democracy was introduced to India 60 years ago, it was an elite concept.

It was a group of people who wanted to introduce democracy because they wanted to introduce concepts such as universal voting, parliament and constitution.

But today, democracy has become a bottom-up process, and everyone recognizes the benefits of having a voice, the benefits of being in an open society.

So it has democracy built in.

I believe six factors contribute to why India is growing faster than ever today: the rise of the concept of population as human capital, the rise of Indian entrepreneurs, the rise of English as the language of dreams, technology as an enabler, globalization as a positive factor, and the deepening of democracy.

But that being said, it comes down to what I call an "idea in progress".

These are ideas that are uncontroversial in society, but they cannot be put into practice.

And there are actually four things here.

One is the issue of education.

For some reason, lack of money, lack of priorities, and old cultured religions never gave primary education the focus it needed.

But now I think we've reached a point where it becomes very important.

Unfortunately the public schools are not functioning so the children are now attending private schools.

Even in India's slums, more than 50 percent of urban children attend private schools.

So there is a big challenge to make the school work.

But with that said, there is a great desire among all, including the poor, to educate their children.

Therefore, I believe that primary education is an idea that has arrived but has not yet been implemented.

Likewise, infrastructure has not been a priority for a long time.

If you've been to India, you've seen it.

It is certainly different from China.

But today, I believe the infrastructure is finally agreed upon and what people want implemented.

It is also reflected in political statements.

Twenty years ago, the political slogan was “roti, kapada, makan,” meaning “food, clothing and shelter.”

And today's political slogan is 'Biziri, Sadak, Pani', which means 'Electricity, Water, Roads'.

And it's a shift in thinking about what infrastructure is now accepted.

So I believe this came up as an idea but just wasn't implemented.

The third is, of course, cities.

Because of Gandhi's belief in villages and because the British ruled from cities, Nehru considered New Delhi a non-Indian city.

For too long we have neglected cities.

And that is reflected in the many situations you see.

But today, through economic reforms and economic growth, I think people are finally accepting the concept that cities are engines of economic growth, cities are engines of creativity, and cities are engines of innovation.

And now I think we're seeing a move towards improving our cities.

Again, the idea has arrived, but has not yet been implemented.

The last is to think of India as a single market. When I didn't think of India as a market, I didn't really care about the single market. Because it didn't really matter.

Thus, a situation has arisen where every state has its own market for the product.

Every state had its own agricultural market.

Currently, policies such as taxation and infrastructure are increasingly moving towards building India as a single market.

So there is some sort of internal globalization going on, and it is just as important as external globalization.

In my opinion, these four elements of primary education, infrastructure, urbanization and single market are ideas that are accepted but not implemented in India.

And I think there are conflicting ideas.

Ideas we discuss.

These are the arguments that lead to deadlocks.

What are those ideas? I think one is a matter of ideology.

Due to India's historical background, caste system and the fact that many people have been marginalized, much of the politics is focused on how to ensure that this issue is addressed.

And that leads to reservations and other techniques.

It also has to do with the way we subsidize the public and all the left and right arguments we have.

Many of India's problems are related to caste ideology and others.

This policy has caused a deadlock.

This is one of the factors that need to be resolved.

The second is Japan's labor policy. The policy has made it very difficult for entrepreneurs to create standardized jobs within companies, with 93 percent of India's workforce working in the unorganized sector.

they have no benefit. No social security. they have no pension. They have no medical care. none of them.

This problem needs to be fixed, because unless we can bring these people into the formal workforce, we will create a mass of people who are completely disenfranchised.

Therefore, we need to enact new labor laws that are less burdensome than they are today.

At the same time, it will give policies to get more people into the public sector, creating jobs for the millions who need to create jobs.

The third is higher education.

Higher education in India is fully regulated.

Starting a private university is very difficult.

It is very difficult for foreign universities to come to India.

As a result, our higher education is far from keeping up with India's demands.

It raises a lot of issues that we have to deal with.

But most important, I believe, are the ideas we need to anticipate.

Here India can look at what is happening in the West and elsewhere and consider what should be done.

First, we are very fortunate that technology is far ahead of the time other countries were developing.

So technology can be leveraged for governance.

We can use technology to gain direct benefits.

We can use technology to achieve transparency and many other things.

The second is health issues.

India has equally dire health problems such as heart disease, diabetes and obesity.

So it makes no sense to replace a set of poor country diseases with a set of rich country diseases.

So we need to rethink the whole way we look at health.

We need to strategize so that we do not end up in adverse health extremes.

Similarly, in the West today, there are issues of rights, such as Social Security costs, Medicare costs, and Medicaid costs.

Younger countries therefore have another chance to introduce modern pension systems to ensure that entitlement issues do not arise in old age.

And again, India needs to connect environment and development, so it can't afford to pollute the environment.

Let's think about it. The world needs to stabilize at around 20 Gigatonnes per year.

For a population of 9 billion people, the average carbon emissions would be about 2 tonnes per year.

India already has 2 tonnes a year.

But if India grows at around 8%, annual per capita income will increase 16 times by 2050.

So income has increased 16 times, but carbon has not increased.

We are therefore fundamentally rethinking how we look at the environment, how we look at energy, and how we create a whole new development paradigm.

So why is this important to you?

Why does it matter to you what's happening 10,000 miles away?

First, it's important because it represents over a billion people.

One billion people, one-sixth of the world's population.

It matters because this is a democracy.

And it is important to prove that growth and democracy are not mutually exclusive, that democracy can be achieved, that open societies can be achieved, and that growth can be achieved.

This is important because if we solve these problems, we will also solve the problem of world poverty.

It is important because it is necessary to solve the world's environmental problems.

If we really want to come to a conclusion, we want to cap our carbon footprint and really reduce our energy use. It needs to be resolved in countries like India.

If you look at the development of the West over 200 years, the average growth rate may have been about 2%.

Here we are talking about countries that are growing at 8-9 percent.

And it makes a big difference.

India's per capita income doubled every 45 years when India was growing at about 3-3.5 percent and its population was increasing at 2 percent.

As economic growth reaches 8% and population growth slows to 1.5%, per capita income doubles every nine years.

In other words, a billion people are certainly fast-forwarding this whole process towards prosperity.

And we must have a clear strategy that is important for India and for the world.

That's why I think you should be as interested in this issue as I am.

thank you very much.

(applause)

In 1884, a patient's luck seemed to go from bad to worse.

This patient had a rapidly growing cancer of the neck, followed by an unrelated bacterial skin infection.

But soon something unexpected happened. As he recovered from the infection, the cancer began to recede.

Seven years later, a doctor named William Corey followed the patient and found no residual visible signs of cancer.

Corey believed something amazing was happening. In other words, they thought that the bacterial infection might have stimulated the patient's immune system to fight the cancer.

Corey's lucky discovery makes him a pioneer in the deliberate injection of bacteria to successfully treat cancer.

Over a century later, synthetic biologists have discovered even better ways to use these once-unlikely cooperators. It is programmed to safely deliver drugs directly to the tumor.

Cancer occurs when the normal function of cells is altered and cells grow rapidly to form growths called tumors.

Treatments such as radiation, chemotherapy, and immunotherapy attempt to kill malignant cells, but in the process, they affect the entire body and can destroy healthy tissue.

However, some bacteria, such as E. coli, have the unique advantage of being able to selectively grow within tumors.

In fact, the tumor center provides an ideal environment for tumors to grow safely, hidden from immune cells.

Instead of causing infections, the bacteria could be reprogrammed to carry anticancer drugs and act as Trojan horses that target tumors from within.

This idea of ​​programming bacteria to sense and respond in new ways is the main focus of a field called synthetic biology.

But how can bacteria be programmed?

The key lies in manipulating their DNA.

By inserting specific gene sequences into bacteria, bacteria can be instructed to synthesize various molecules, including molecules that inhibit cancer growth.

They can also be made to behave in very specific ways with the help of biological circuits.

They program different behavior depending on the presence, absence, or combination of certain factors.

For example, tumors have low oxygen and pH levels and produce too much of certain molecules.

By programming bacteria to sense these conditions, synthetic biologists can react to tumors while avoiding healthy tissue.

One type of biological circuit, known as the synchronous lytic circuit (SLC), allows bacteria to not only deliver drugs, but to do so on a set schedule.

First, to avoid damaging healthy tissue, anticancer drug production begins with bacterial growth, but only within the tumor itself.

Then, after the bacteria produce the drug, a kill switch explodes the bacteria when they reach a critical population threshold.

This releases the drug and reduces the number of bacteria.

However, a certain percentage of bacteria remain alive to replenish the colony.

Eventually the number will be large enough to trigger the kill switch again and the cycle will continue.

This circuit can be fine-tuned to deliver drugs on a regular schedule that is optimal for fighting cancer.

This approach has shown promise in scientific trials using mice.

Not only did the scientists inject bacteria to eliminate lymphoma tumors, but the injections stimulated the immune system, stimulating immune cells to identify and attack untreated lymphomas elsewhere in the mice.

Unlike many other therapies, the bacteria do not target specific types of cancer, but rather general features common to all solid tumors.

And programmable bacteria aren't just limited to fighting cancer.

Instead, they act as advanced sensors that monitor the site of future disease outbreaks.

Safe probiotic bacteria probably lie dormant in our intestines, and can detect, prevent, and treat disease before it causes symptoms.

Advances in technology are creating excitement for the future of personalized medicine powered by mechanical nanobots.

But thanks to billions of years of evolution, we may already have a starting point for an unexpected biological form of bacteria.

Add synthetic biology to this and who knows what will soon be possible.

William Golding was losing faith in humanity.

A British destroyer during World War II, a philosophy teacher turned Royal Navy Lieutenant, he constantly faced the atrocities of his peers.

And when he returned to Britain to see Cold War superpowers threatening each other with nuclear annihilation, he was forced to question the very roots of humanity.

These musings on the inevitability of violence inspired his first and most famous novel, Lord of the Flies.

After being rejected by 21 publishers, the novel was finally published in 1954.

The title is taken from Beelzebub, the demon associated with two central themes of Golding's book: pride and war.

The novel was a dark satire of classic island adventure stories, a popular genre in which boys are shipwrecked in exotic locations.

The protagonists of these stories are able to master nature while avoiding the dangers posed by their new surroundings.

The genre also supported the problematic colonialist tales found in many British films of the time, in which the boys taught island natives good British values.

Golding's satire even makes explicit use of R.M.'s setting and character name. Ballantine's Coral Island is one of the best-loved island adventure novels.

But while Ballantine's book promised its readers "pleasure... profit...and endless entertainment," Golding's had something dark in store.

"Lord of the Flies" begins with the boys already on the island, but snippets of dialogue hint at their terrifying journey. Their plane was shot down in the middle of an unspecified nuclear war.

Boys between the ages of 6 and 13 do not know each other.

All but a choir in a black uniform and led by a boy named Jack.

Much like Ballantine's "Coral Island", the boy's new home looks like a paradise with fresh water, shelter and abundant food sources.

But even from the beginning of the novel, there is an eerie darkness in this seemingly peaceful situation.

The boys' shadows are likened to "black bat-like creatures", and the choir itself at first appears to be "something black ... groping" on the beach.

Within hours of their arrival, the boys are already exchanging terrifying rumors about a ferocious "beast" lurking in the woods.

From these ominous beginnings, Golding's story reveals how quickly partnerships can crumble in the absence of adult authority.

Initially, the survivors try to establish some degree of order.

A boy named Ralph breathes on the conch shell to gather the group and delegate the mission.

But as Jack battles Ralph for leadership, the group splits and the boys give in to dark impulses.

The children of the mob quickly forget their rescue plan, silence the few voices of reason, and follow Jack blindly to the edge of the island and to the edge of sanity.

The novel's universal themes of morality, civility, and society satirize both the conventions of the time and long-held beliefs about human nature, making it a classic of literature.

Island adventure stories often endorse colonialism, but "Lord of the Flies" flips this trope upside down.

Rather than portraying the natives as brutally stereotypical savages, Golding turns angelic English schoolboys into barbaric caricatures.

And while the boys wage their own battles on the island, the much more devastating war that brought them there continues off the page.

Even if the boys are rescued, what kind of world will they return to?

With few references to pinning the characters to a particular place or time, the novel feels truly timeless and seems to be the most raw examination of human nature.

And while not all readers may agree with Golding's stark views, "Lord of the Flies" provokes enough angst to challenge even the most determined optimists.

Believe it or not, I am proposing a vital climate-focused solution to a very important part of this big problem.

And the solution I propose is to the greatest culprits of humanity's massive abuse of the planet and the resulting decline of the biosphere.

The culprit is business and industry, which I happened to have spent the last 52 years in since graduating from Georgia Tech in 1956.

As an industrial engineer, he was aspiring and then a successful entrepreneur.

Thirty-six years ago, in 1973, after founding my company, Interface, from scratch to produce carpet tiles for the corporate and institutional markets in the United States, and having survived the company from its inception and led it to prosperity and global dominance in the field, I read Paul Hawken's book The Ecology of Commerce in the summer of 1994.

In his book, Paul accuses business and industry, first, of being the main culprits in causing the decline of the biosphere, and second, of being the only organization large enough, pervasive enough, and powerful enough to truly lead humanity out of this mess.

By the way he convicted me as an earth plunderer.

And I appealed to the people at my company, Interface, to lead our company and the entire industry towards sustainability. Sustainability was defined as naturally and rapidly extracting from the earth only what it can ultimately renew, not taking a single drop of new oil, and operating oil-intensive companies in a way that does not harm the biosphere.

Take nothing, do no harm.

I simply said, "If Hawken is right and business and industry must lead, who will lead business and industry?"

No one leads unless someone leads. ”

It's an axiom. why not us?

And thanks to the people at Interface, I became a recovering predator.

(Laughter.) (Applause.) I once told a Fortune writer that one day people like me will go to jail.

And it became the headline of a Fortune magazine article.

They went on to call me America's greenest CEO.

From plunderer to plunderer to America's greenest CEO in 5 years - frankly, this was a pretty sad comment to America's CEO in 1999.

Later in the Canadian documentary The Corporation, when asked what the statement "go to jail" meant, I replied that stealing is a crime.

And stealing our children's future will one day become a crime.

But for that to be true, for stealing our children's future to be a crime, there must be a clear and demonstrable alternative to the "make and waste" industrial system that dominates our civilization and is the main culprit in stealing our children's future: digging up the earth and converting it into products that are ready for waste in landfills and incinerators; I realized.

According to Paul and Anne Ehrlich and the famous environmental impact equation, impacts, albeit badly, are a product of population, affluence and technology.

So impact is created by people, what they consume in their abundance and how it is produced.

And while the equation is largely subjective, we can probably quantify people, and maybe we can quantify affluence, but technology is being abused in too many ways to be quantified.

The equation is therefore conceptual.

Still, it helps me understand the problem.

So in 1994 we set out to make an example at Interface. It is about transforming the way carpets are made, a product that consumes a lot of petroleum both in material and energy, and transforming the technology to reduce rather than increase the environmental impact.

Paul and Anne Ehrlich's environmental impact equation: I equals P times A times T: population, affluence, technology.

I wanted Interface to rewrite that equation so that I equals P multiplied by A divided by T.

Now, those familiar with mathematics will quickly realize that T in the numerator increases the effect (which is bad), but T in the denominator decreases it.

So I ask, "What moves T, the technology, from the numerator that increases impact (call it T1) to the denominator that decreases impact (call it T2)?"

When I thought about the characteristics of the first industrial revolution T1 while practicing it with an interface, I found the following characteristics.

Extraction: Taking raw materials from the earth.

Linear: Acquire, Create, Dispose.

It uses energy derived from fossil fuels.

Wasteful: Abusive and focused on labor productivity.

The number of carpets per man-hour increases.

After some thought, I realized that to move T to the denominator, I would have to change all of these attributes.

The new industrial revolution will require replacing extractive resources with renewable energy. Linear and circular. Renewable energy, fossil fuel energy from sunlight. Eliminate waste by doing nothing. and benign abuse. Labor productivity through resource productivity.

And I thought that if we could make these transformative changes and get rid of T1 completely, we could have zero impact, including our impact on climate.

That became the interface project in 1995, and has been the project ever since.

We measured our progress very closely.

So I can tell you how far we've come in the next 12 years.

Net emissions of greenhouse gases decreased by 82% in absolute tonnage.

(Applause.) In the same period, sales have increased by two-thirds and profits have doubled.

An absolute reduction of 82% therefore corresponds to a 90% reduction in greenhouse gas intensity relative to sales.

This is the amount of reduction that the world's technosphere must achieve by 2050 to avoid catastrophic climate change, scientists say.

Renewable energy efficiency has reduced fossil fuel use by 60% per unit of production.

The cheapest and safest barrels of oil in existence are those that are not used efficiently.

Our global carpet tile business has reduced water usage by 75%.

Our broadloom carpet business, which we acquired in 1993 here in Industrial City, California, where water is at a premium, is down 40%.

Renewable or recyclable materials make up 25% of the total and are growing rapidly.

Renewable energy is 27% of our total, making it 100%.

We have diverted 148 million pounds, or 74,000 tonnes of post-consumer carpet from landfills and closed the material stream through reverse logistics and post-consumer recycling technologies that didn't exist when we started 14 years ago.

These new circular technologies have contributed significantly to the fact that we have produced and sold 85 million square yards of climate-neutral carpet since 2004. This means that there is no net contribution to global climate change in producing carpets throughout the supply chain, from mining and well drilling to waste landfills. Certified by an independent third party.

We call it Cool Carpet.

And it has become a strong market differentiator, increasing sales and profits.

Three years ago we launched a residential tile carpet under the brand "Flor", a misspelling of F-L-O-R.

Point and click today at Flor.com and you can have your Cool Carpet delivered to your door in less than 5 days.

It's as practical as it is beautiful to look at.

(Laughter) (Applause) We think we're a little over halfway to our zero impact, zero footprint goal.

We have set 2020 as the year we aim to reach Zero Zero, the top of the Sustainability Mountain.

We call this Mission Zero.

And this is perhaps the most important aspect. I've found Mission Zero to be incredibly good for business.

A better business model, a better way to greater profits.

This is the business case for sustainability.

Practical experience shows that costs have declined, not increased, reflecting nearly $400 million in costs averted in pursuing the first aspect of Mount Sustainability: Zero Waste.

This paid the full cost of the Interface transformation.

And it also dispels the myth of making the wrong choice between the environment and the economy.

Our products are the best yet inspired by design for sustainability, a source of unexpected innovation.

Our employees are passionate about this common higher purpose.

When it comes to attracting and bringing together the best talent, nothing beats it.

And the market favor is amazing.

No amount of advertising, no clever marketing campaign, no amount of money could have generated so much goodwill.

Costs, products, people, markets, what else?

It's a better business model.

And here are our 14-year sales and profit records.

There was a dip in 2001-2003 where our sales were down 17% over three years.

However, the market fell 36%.

We literally gained market share.

We may have survived the recession because we had the advantage of sustainability.

If every company pushed an interface plan, would all problems be solved?

i don't think so.

I'm still stuck with the modified Ehrlich equation, i.e. I is P multiplied by A divided by T2.

That A is a capital A suggests that abundance itself is an end.

But what if we reconfigure Ehrlich further?

And what if A was a lowercase 'a' to imply that it was a means to an end and that end was happiness—more happiness with less?

You know, it would be about rebuilding civilization itself — (applause) — and our entire economic system, if not for our species, but perhaps for our heirs, a sustainable species that will live for a thousand or ten thousand generations, an indefinite future, on a finite planet, ethically, happily, and ecologically in balance with nature and all natural systems.

But should the Earth wait for us as a species to go extinct?

Well maybe. But I don't think so.

At Interface, we intend to keep this quintessential sustainable zero-footprint industrial company fully viable by 2020.

We can now see the way to the top of that mountain.

And now that challenge is being fulfilled.

And, as my good friend and advisor Amory Robbins says, "If something exists, it must be possible."

(laughs) If you can actually do it, you should be able to do it.

If we oil-intensive companies can do it, anyone can do it.

And if anyone can do it, it means that anyone can do it.

Hawken enriched business and industry and lifted mankind from the abyss. Because the continued decline of the biosphere puts very important people at risk here. It's an unacceptable risk, frankly.

Who is that person?

not you Not me.

But let me introduce you to those most at risk here.

And I myself met this person in the early days of this climb.

One Tuesday morning in March 1996, I was taking people in and talking to people, as I did at every opportunity at the time, and often I wasn't sure if I was connected.

But about five days later, back in Atlanta, I received an email from Glenn Thomas, one of the members of the California Conference.

He sent me an original poem he wrote Tuesday morning after spending time together.

And when I read it, it was one of the most uplifting moments of my life.

Because it was said by God that one man got it.

Here is what Glenn wrote. And it is the person who is most at risk.

Please meet "Tomorrow's Child".

"Tomorrow's child whose name I don't see, whose face I don't know, time and place I don't know, you haven't been born yet, but I met you for the first time last Tuesday morning.

A wise friend introduced us both.

And through his sober perspective, I saw a day for you that you would see, a day that was not for me.

Knowing you changed my way of thinking.

Because it never occurred to me that what I was doing might threaten you one day.

Tomorrow's children, daughters, sons, unfortunately I'm only just beginning to think about you and your interests, but I always knew I should.

start, i will.

What I have wasted, what I have lost, if I forget, someday you will come and live here. ”

Now, every day of my life since then, Tomorrow's Child has spoken to me with a simple yet profound message. I would like to share that with you.

Each of us is part of the web of life.

The human continuum, to be sure, but in a broader sense, the web of life itself.

And we are faced with the choice of hurting or helping the planet during our brief visit to this beautiful blue and green living planet.

For you it is your calling.

thank you.

(applause)

Let's talk a little bit about unreasonable behavior.

Not yours, of course, but someone else's.

(Laughter) So after a few years at MIT, I realized that writing academic papers wasn't all that fun.

I don't know how many books you've read, but they're not fun to read, often not fun to write, and even worse to write.

So I decided to write something more interesting.

Then I got the idea to write a cookbook.

And the title of my cookbook was going to be "Breadless Eating: The Art of Eating Over the Sink."

(Laughter.) And it would be looking at life through the kitchen.

I was pretty excited about this.

I was going to talk a little bit about research and a little bit about the kitchen.

I wrote a few chapters and took it to MIT Press, and they said, "That's interesting, but it's not for us. Go and find someone else."

I've tried other people and they all said the same thing, "Cute. Not for us."

Until someone said, ``Look, if you're serious about this, you have to write about your research first.

If you really want to do it, you have to do it. ”

I've been doing it all day, but I want to write something that's a little more free and less constrained. ”

Then he said very forcefully: "Look, that's the only way you can do it."

So I said, "Okay, if you have to--" and I took my leave.

Then I will write a cookbook. ”

And it turned out to be a lot of fun for two reasons.

First, I enjoyed writing.

But what's more interesting is that I started learning from people.

It's a great time to write because you get a lot of feedback from people.

People write to me about their personal experiences, their examples, their disagreements, and their nuances.

And just being here, I mean, over the last few days, I've seen heights of compulsive behavior I never thought I'd have.

(Laughter) I think it's very attractive.

A few words about irrational behavior. First, I would like to give some examples of optical illusions as metaphors for rationality.

So let's consider these two tables.

And you must have seen this illusion too.

If asked which is longer, the vertical line on the left table or the horizontal line on the right table, which one do you think is longer?

Does anyone know anything other than that the left side is longer?

No rights? It's impossible.

But the nice thing about optical illusions is that you can easily prove them wrong.

So we can add some lines. it doesn't help.

You can animate lines.

And as much as you believe I didn't shrink the line, which I didn't, I proved that your eyes were deceiving you.

Now, the interesting thing about this is that when you remove the lines, it looks like you haven't learned anything at the last moment.

(Laughter) You can't look at this and say, "Right now, I'm seeing reality as it is."

right? It is impossible to overcome the feeling that it is indeed long.

Our intuition really tricks us in repeatable, predictable, and consistent ways.

And there is little we can do about it other than pick up a ruler and start measuring.

There is one more thing. One of my favorite fantasies.

What color does the arrow above point to?

Audience: Brown. Dan Ariely: Brown. thank you.

What? yellow.

Can anyone see them as one and the same?

It's very, very difficult.

You can cover the rest of the cube.

Covering the rest of the cube, we see that they are identical.

If you don't believe me, get the slides later and do some art work to make sure they are identical.

But again, it's the same story of removing the background and the illusion returns.

I can't help but see this illusion.

I don't think people who are colorblind can see it.

Think of fantasy as a metaphor.

Vision is one of the best things we do.

A large part of our brain is dedicated to vision, and it's bigger than anything else.

We spend more time in our day with sight than anything else.

We are evolutionarily designed to take advantage of our vision.

And if we have such predictable and recurring mistakes in the vision we are good at, how likely are we not to make more mistakes in areas we are not so good at, like financial decision making?

(Laughter) We have no evolutionary reason to do it, we don't have a special part of our brain, we don't spend that much time in our day.

The argument is that in cases like this, we actually make a lot more mistakes.

Worse, there is no easy way to see them, as mistakes can be easily demonstrated by visual illusion. Cognitive illusion makes it much harder to prove people wrong.

So I want to show you some of the same cognitive illusions, illusions about decision making.

This is one of my favorite plots in social science.

This is from the paper by Johnson and Goldstein.

This basically shows the percentage of people who expressed an interest in donating their organs.

These are different European countries.

There are basically two types of countries displayed. The country on the right looks like it has a lot to offer. And left-wing countries donate very little, or much less.

The question is why?

Why do some countries give more and others less?

Asked this question, most people would think it must be about culture.

How much do you think about people?

Donating an organ to someone else probably depends on how much you care and how connected you are to society.

Or maybe it's about religion.

But looking at this plot, we see that countries that we think are very similar actually behave very differently.

For example, Sweden is on the far right, and Denmark, which seems to be culturally very similar, is on the far left.

Germany on the left, Austria on the right.

Holland on the left, Belgium on the right.

And finally, depending on your particular version of European similarity, you can think of Britain and France as being either culturally similar or not, but you'll find that they differ significantly when it comes to organ donation.

By the way, Holland has an interesting story.

Holland is like the largest country in a small group.

A letter urging citizens to participate in the organ donation program was mailed to every household in the country and was found to reach 28%.

You know the expression, "You can only do so much when you beg".

28% for organ donation.

(Laughter.) But whatever the right-wing countries do, they are doing a much better job than begging.

So what are they doing?

It turns out the secret has to do with the DMV form.

And here is the story.

In the countries on the left, the DMV has a form like this:

"If you would like to participate in the organ donation program, please check the box below."

And what will happen?

People don't check, they don't participate.

The countries on the right, the countries that donate the most, have a slightly different shape.

It reads, "If you don't want to participate, please check the box below...".

Interestingly, the people who received this didn't check back, but are now participating.

(Laughter) Now let's think about what this means.

You know, we wake up in the morning feeling like we've made a decision.

We wake up in the morning and open the closet. We feel we are the ones who decide what to wear.

It feels like opening the fridge and deciding what to eat.

What this really means is that many of these decisions do not exist within us.

They reside in the person who designed the shape.

When you step into the DMV, whoever designed the form has a big impact on what they end up doing.

Now, intuitively understanding these results is also very difficult.

Think for yourself.

How many of you believe that if you go to the DMV to renew your license tomorrow and come across one of these documents, it will actually change your behavior?

It is very unlikely that it will affect us.

We can say, "Oh, these funny Europeans, of course it will affect them."

But when it comes to us, we have a feeling that we are in the driver's seat, that we are in control and that we are making the decisions, and it is very difficult even to accept the idea that we are under the illusion that we are actually making the decisions instead of the actual ones.

Now, you might say, "These are decisions we don't care about."

In fact, by definition, these are decisions about what happens after we die.

How can we care about anything more than what happens after we die?

So a standard economist, someone who believes in rationality, would say:

We get this effect because the cost of lifting a pencil to mark a 'V' is higher than the gains made by that decision. ”

(Laughter) But really, it's not because it's easy.

It's not because it's trivial. It's not because we don't care.

It's the other way around. Because we care.

It's hard and complicated.

And it's so complicated that I don't know what to do.

And since I have no idea what to do, I just choose what was chosen for me.

I'll give you another example.

This is from a paper by Redelmeier and Shafir.

And they said, "Will this effect also happen to professionals?"

A high earner, an expert in their own decisions, and someone who makes a lot of decisions?”

And they took a group of doctors with them.

They presented a case study of a patient.

They said, 'Here's a patient, a 67-year-old farmer.

He had been suffering from right hip pain for some time. ”

And they said to the doctors, "You decided a few weeks ago that nothing worked for this patient.

All these drugs seem to do nothing.

Therefore, the patient is referred to total hip arthroplasty.

Hip replacement surgery. have understood? "

Therefore, the patient is on the road to hip replacement.

Then they said to half the doctors, "Yesterday you went through a patient's case and realized that you forgot to try a certain drug.

You haven't tried ibuprofen.

What is your occupation? Bring the patient back and try ibuprofen?

Or release him to have a hip replacement? ”

Well, the good news is that most doctors in this case decided to pull their patients out and try ibuprofen.

Very good for doctors.

Another group of doctors said, "Yesterday, when we reviewed this case, we found two drugs we hadn't tried: ibuprofen and piroxicam."

There are two drugs I have not tried yet.

What is your occupation? Will you let him go or will you pull him back?

And if it pulls him back, try ibuprofen or piroxicam? which one? "

Well, think about it. This decision makes it easier to get the patient to continue with the hip replacement, but pulling the patient back suddenly becomes more complicated.

I have one more decision to make.

what happened now?

Today, the majority of doctors choose to have their patients undergo hip replacement surgery.

By the way, I hope this worries you -- (Laughter) when you go to the doctor.

The problem is, he's a doctor who never says, "Piroxicam, ibuprofen, hip replacement. Let's go for hip replacement."

But the moment you set this as your default, it has a huge impact on what people end up doing.

Here are some more examples of irrational decision making.

Please try to imagine. I'm going to give you a choice. Do you want to pay for hotels, transportation, meals, continental breakfast and everything else and go to Rome for the weekend, or do you want to spend the weekend in Paris?

Well, a weekend in Paris, a weekend in Rome, these are different things.

They have different foods, different cultures, different arts.

Imagine adding an option to the set that no one wanted.

Imagine if I said, "A weekend in Rome, a weekend in Paris, or was your car stolen?"

(Laughter) Interesting idea. Because in this set, does having a car stolen affect anything?

(Laughter.) But what if the option of having your car stolen wasn't exactly like this?

What if it's a trip to Rome, transportation, breakfast are all paid for, but your morning coffee isn't included?

If you want coffee, you have to pay for it yourself and it's €2.50.

(Laughter) In a way, you can enjoy Rome with coffee, so why would you want Rome without coffee?

It's like having your car stolen. It's an inferior option.

But what do you think happened?

The moment you add Rome without coffee, Rome with coffee becomes more popular and people choose it.

The fact that there is Rome without coffee makes Rome with coffee look better than just Rome without coffee, and even better than Paris.

(Laughter) Here are two examples of this principle.

This was an ad from The Economist a few years ago that offered three options: a $59 online subscription, a $125 print subscription, or $125 for both.

(Laughter) Well, I saw this and called The Economist to try and understand what they were thinking.

And then they handed me over and over until I finally got to the person in charge of the website and I called them and they went to see what was going on.

Next thing I noticed, the ad had disappeared, but there was no explanation.

So I decided to do an experiment that I really wanted The Economist to do with me.

I gave this to 100 MIT students.

I said, "What would you choose?"

These are market shares. Most people wanted combo deals.

Thankfully no one wanted that dominant option.

This means that students can read.

(Laughter) But now, if there's an option that no one wants, it's okay to take it off, right?

So I printed another version with the middle option removed.

I gave it to another 100 students. Here's what happened. The most popular option now became the least popular option, and the least popular option became the least popular option.

What was happening was a useless option in the middle in the sense that no one wanted it.

But it wasn't in vain in the sense that it helped people understand what they wanted.

In fact, buying print and web for $1.25 seemed like a great deal compared to the middle option ($1.25 for print only).

And as a result, people chose it.

By the way, the general idea here is that we don't really know our preferences very well.

And because we don't know our preferences very well, we are susceptible to all external influences, including defaults and specific options presented to us.

Here's another example of this.

People believe that when we deal with physical attraction, when we look at someone, we immediately know if we like or are attracted to that person.

That's why we have this 4 minute date.

So I decided to do this experiment on people.

The images shown here are not real people, but the experiments were conducted on humans.

I showed some people a picture of Tom and a picture of Jerry.

And I said, 'Who do you want to date?

But for half the people, I added an ugly version of Jerry.

I used Photoshop to make Jerry a little less appealing.

(Laughs) Added an ugly version of Tom for the benefit of others.

And the question was, can Ugly Jerry and Ugly Tom help their more attractive siblings?

The answer was a resounding yes.

Jerry was popular when there was ugly Jerry.

Tom was popular when Ugly Tom was around.

(Laughter) Of course, this has two very distinct effects on life in general.

Who would you like to take with you when you go bar hopping?

(Laughter) You want a slightly uglier version of yourself.

(laughs) Similar, but a little uglier.

(Laughter) The second point, of course, is that if someone invites you up the bar ladder, you know what they think of you.

(Laughter) I understand now.

What are the general points?

The general point is that when we think about the economy, we have a beautiful view of human nature.

"What a wonderful job man is! What a sublime thing in reason!"

We see ourselves and others in this way.

The behavioral economics perspective is a little less "tolerant" with people. In fact, medically that is our view.

(Laughter.) But there is also a ray of hope.

I think this silver lining is kind of what makes behavioral economics interesting and exciting.

Are we Superman or are we Homer Simpson?

We kind of understand our limitations when it comes to building the physical world.

We build steps.

And what we're building is obviously not for everyone.

(laughter) We know our limits and we will overcome them.

Yet somehow, when it comes to the spiritual world, we forget the idea that we are limited when designing things like healthcare and retirement and the stock market.

I think if we understand our cognitive limits, just like we understand our physical limits, we can design a better world, even if they don't look at us in the same way, and I think that's the hope for this thing.

thank you very much.

(applause)

At Aunt Anmei's house, Jinmei reluctantly sits in the eastern corner of the mahjong table.

In the north, south and west corners are her aunts who are longtime members of the Joy Luck Club.

This group of immigrant families gathers weekly to gossip, eat wontons and sweet char way, and play mahjong.

However, the club's founder Jinmei's mother, Mr. Suyuan, recently passed away.

At first, Jinmei struggles to fill the seats at the table.

But when her aunts uncover a deeply hidden secret about Suyuan's life, Jinmei realizes that she still has a lot to learn about her mother and herself.

In Amy Tan's 1989 debut novel The Joy Luck Club, this gathering at the Mahjong table serves as the starting point for a series of interconnected episodes.

The book itself is loosely structured to mimic the format of the Chinese game.

Much like Mahjong is played over four rounds with at least four hands, the book is divided into four parts, each with four chapters.

Set in alternating China and San Francisco, each chapter tells the story of one of the Joy Luck Club's four matriarchs, or their American-born daughters.

These stories take readers through war zones and rural Chinese villages, into modern marriages and tense gatherings around the dinner table.

They touch on themes such as survival and loss, love and lack of love, ambition and unfulfilled reality.

One of them leads to Aunt Lynn planning an escape from her promised husband's hostile family and eventually arriving in America.

In another story, Rose is overwhelmed by the responsibilities imposed on her by her mother, turning a day at the beach into a disaster for the Sioux American family.

The resulting tragedy traumatizes the family for years to come.

These stories illustrate the common divides that can form between generations and cultures, especially among immigrant families.

All mothers have experienced great difficulties during their lives in China and have worked tirelessly to give their children better opportunities in America.

But daughters feel burdened by their parents' unfulfilled hopes and high expectations.

Jinmei feels this pressure while playing mahjong with her mother's friends.

she is worried “In me, they see their daughters as ignorant and as indifferent about all the truth and hope they brought to America.” Time and again, mothers seek to remind their daughters of their history and traditions.

Meanwhile, the daughters struggle to reconcile their mother's perception of themselves with who they really are.

"Does my daughter know me?" some stories ask.

"Why can't my mother understand?" others respond.

During the interrogation of these questions, Tan spoke of anxieties that plague many immigrants. They often feel alienated from their homeland and cut off from the country they are used to living in.

But by weaving together the stories of these four mothers and daughters, Tan makes it clear that Jinmei and her peers find strength in the values ​​their mothers have passed on to them to tackle contemporary problems.

When "The Joy Luck Club" was first published, Tan expected minimal success.

However, contrary to her expectations, the book was a huge success both critically and commercially.

These characters still fascinate readers around the world.

It's not just the way they tell their Chinese-American and immigrant experiences, but it also helps them uncover deeper truths they want their loved ones to see and understand.

are you OK.

Here are some images from a very interesting paper published in The Journal of Ultrasound in Medicine.

At the extreme end of the spectrum, this is the most distracting paper published in the Journal of Medical Ultrasound.

The title is "Intrauterine Masturbation Observation".

(Laughter) Okay. You can see a hand (big arrow) on the left and a penis on the right. Hand hovering.

And here is, in the words of radiologist Israel Meisner, "a hand that grips the penis in a manner that resembles a masturbation movement."

Keep in mind that this was an ultrasound, so it could have been a video.

Orgasm is a reflex of the autonomic nervous system.

This is the part of the nervous system that deals with digestion, heart rate, sexual arousal, and other things we have no conscious control over.

And the orgasmic reflex can be triggered by a surprisingly wide range of inputs.

genital stimulation. Of course.

But Kinsey also interviewed a woman who could orgasm by having someone stroke her eyebrows.

People with spinal cord injuries, such as paraplegia and quadriplegia, often develop a very sensitive area just above the injury site.

In the literature there is something called knee orgasm.

I think the most interesting thing I came across was a case report of a woman who had an orgasm every time she brushed her teeth.

(Laughter) Something about the complex sensorimotor act of brushing her teeth was causing the orgasm.

And she went to a neurologist, and he was fascinated.

He checked to see if it was in the toothpaste, but no, it happened with any brand.

They poked her gums with a toothpick to see if it was affecting them.

No, it was the whole move.

And what is surprising to me is that this woman seems to have excellent oral hygiene.

(Laughter) Sadly, this is what the journal article says. "She believed she was possessed by an evil spirit and switched to mouthwash for oral care."

so sad.

(Laughter) During the writing of this book, I interviewed women who could consider themselves to orgasm.

She was participating in research at Rutgers University.

You will love it. Rutgers.

So I interviewed her at a sushi restaurant in Auckland.

And I said, "So, can you do it here?"

And she said, "Yes, but I'd like to finish my meal if you don't mind."

(Laughs) But then she kindly gave me a demo on the bench outside.

It was amazing. It took about 1 minute.

And I said to her, "Do you just do this all the time?"

(laughter) she said. "No. To be honest, I'm always very tired when I get home."

(Laughter) She said the last time she did that was on the Disneyland tram.

(Laughter) The headquarters of the orgasm is here, along the spinal nerves, in something called the sacral nerve root.

And stimulating the exact spot with the electrodes will provoke an orgasm.

And it is true that even a dead person, some kind of dead person, a corpse with a beating heart, can trigger spinal reflexes.

Now, this is someone who is legally dead in a brain-dead state and has been checked for sure, but is kept alive on a ventilator to oxygenate his organs for transplantation.

Now, in these brain-dead people, when you trigger the right place, sometimes you'll see something.

There is a reflex called the Lazarus reflex.

And this proves, to the best of my ability, that I am not dead.

It is like this. you cause the place

A dead man, or a girl...be like that.

This is very disturbing for people working in pathology labs.

(Laughter) Now, if you can trigger the dead person's Lazarus reflex, why not the orgasmic reflex?

I asked Stephanie Mann, a brain death expert, this question, and he foolishly emailed me back.

(Laughter) I said, 'So can you think of causing an orgasm in a dead person?'

She said, "Yes, if the sacral nerve is oxygenated, it probably can."

Obviously, it's not that much fun for the person.

But it's going to be an orgasm -- (laughter) still.

There is a researcher at the University of Alabama who studies orgasms.

I told her, "You should do an experiment."

Look? If you work at a university, you can get a corpse. ”

I said, "You really should."

She said, "We'll get approval from the Human Subjects Review Board for this."

(Laughter) According to Theodor van de Velde, author of The Marriage Manual of the 1930s, a slight semen odor can be detected in a woman's breath within about an hour after intercourse.

Theodore van de Velde was a cum lover of sorts.

(Laughs) This person is the author of the book "Ideal Marriage".

A very heavy hetero man.

However, in his book, The Ideal Marriage, he states that he can distinguish between a young man's semen, which has a fresh, invigorating scent, and a mature man's, which smells like semen, "very similar to the scent of Spanish chestnut flowers.

Sometimes it smells very fresh and floral, other times it smells very pungent. ”

(Laughter) Okay. In 1999, a man in Israel started having hiccups.

And this was one of those cases that went on and on.

He tried everything his friends suggested.

Nothing seemed to help.

Days passed.

At one point, a man had sex with his wife while having hiccups.

And suddenly the hiccups disappeared.

So he told his doctor, who published a case report in a Canadian medical journal entitled "Sexual Intercourse as a Potential Cure for Intractable Hiccups."

I love this article because at one point it suggested that people with persistent hiccups could try masturbation.

(laughter) I love it. Because there is such a thing as an entire demographic of having unattached hiccups.

(Laughter) Married, single, unattached hiccups.

In the 1900s and early 1900s, many gynecologists believed that when a woman reached orgasm, contractions would draw the semen up from the cervix and deliver it very quickly to the egg, thereby increasing the chances of conception.

It was called "The Upsack Theory".

(Laughter) As far back as Hippocrates, doctors believed that the female orgasm was not only helpful in getting pregnant, it was necessary.

Physicians of the time routinely taught men the importance of pleasing their wives.

Theodore van de Velde, author of the Marriage Manual and semen detector -- (laughter) has this line in his book:

I loved this person.

In his book, he left this line, which seems to have originated in the Habsburg Monarchy, where the Empress Maria Theresa, who was struggling with pregnancy, lived.

And the royal doctor seems to have told her, "I believe that Her Most Holy Majesty's vulva should be stimulated for some time before intercourse."

(Laughter) Apparently, I don't know, but it's on the record somewhere.

Masters and Johnson: Now we're heading into the 1950s.

Masters and Johnson were skeptics, but it's actually fun to say.

they didn't buy it.

And they, as Masters and Johnson, are determined to get to the bottom of it.

They took the women, I think there were five of them, into the lab and put them on cervical caps containing artificial semen.

And the artificial semen contained a radiopaque substance that could be seen on X-rays.

This is the 1950's.

Anyway, these women were sitting in front of the X-ray machine.

and they masturbated.

Masters and Johnson then checked to see if the semen had been sucked.

No evidence of upsack was found.

You may be wondering, "How do I make artificial semen?"

(Laughter) I have an answer. There are two answers.

You can use flour and water or cornstarch and water.

In fact, I found 3 separate recipes in the literature.

(Laughter) My favorites are those that list the ingredients and the recipe says, for example, "Yield: 2 dozen cupcakes."

This person said, "Give in: Ejaculate once."

(Laughter) There's another way orgasms can increase fertility.

This involves men.

Sperm that remain in the body for more than a week begin to develop abnormalities that reduce their ability to penetrate the egg with head bumps.

British sexologist Roy Levin speculates that this is probably why men have evolved to masturbate so eagerly and often.

He said, "If I keep throwing myself, fresh sperm will be produced."

I thought this was an interesting idea, a theory.

Now we have an evolutionary excuse.

(Laughter) Okay.

(Laughter) Okay. In the animal kingdom, eg pigs, there is considerable evidence of depression.

In Denmark, the Danish National Pig Board found that sexual stimulation during artificial insemination of sows increased the farrowing rate, i.e. the number of piglets produced, by 6 percent.

So they devised a five-point stimulation plan for sows.

The barn is lined with posters and comes with a DVD.

And then I got this DVD.

(Laughter) I'll show you the clip, so this is the unveiling.

(Laughter) So, okay.

Come on, la la la, go to work.

It all looks so innocent.

I'm trying to do with my hands what a wild boar without hands uses its nose. have understood.

(laughs) This is it.

(Laughter) This is to mimic the weight of a boar.

(Laughter) You know, a pig's clitoris is inside the vagina.

So this might be kind of exciting for her.

(laughs) And I'm happy with the results.

(Applause) I love this video.

Earlier in the video, there's a zoomed-in close-up of his hand with a wedding ring on it, almost like he's saying, "Okay, that's his job."

(Laughter) Okay. When I was in Denmark, my host was named Anne Marie.

Why don't farmers do it?

It's not one of your five steps. ”

You have to read what she said, because I love it.

“Even just getting the farmer to touch me under my vulva was a big hurdle,” she said.

So we decided not to mention the clitoris for now. ”

(Laughter.) But the shy but ambitious pig farmer can buy a sow vibrator that dangles from the sperm supply tube and vibrates—it's true.

Because, as I said earlier, the clitoris is inside the vagina.

So maybe you're a little more excited than you seem.

And I said to her, 'Here, these sows.

The sow does not appear to be in ecstasy. ”

And she said that animals don't show pain or joy on their faces like we do, so we can't draw that conclusion.

They use the top half of their face. Ears are very expressive.

I mean, I don't quite understand what's going on with the pigs.

Primates, on the other hand, use their mouths a lot.

This is the ejaculation face of the giant monkey.

(Laughter) And, interestingly, this has also been observed in female monkeys, but only if they mount to another female.

(laughs) Masters and Johnson.

In the 1950s, they decided to unravel the entire sexual response cycle, from male and female arousal to orgasm, all occurring within the human body.

Well, with women, a lot of this stuff happens on the inside.

But Masters and Johnson didn't stop.

They developed an artificial sex machine.

This is basically a penis camera with a motor.

It has a clear acrylic phallus with a camera and a light source attached to a motor like this.

And women end up having sex with it.

that's what they do. Pretty amazing, isn't it?

Unfortunately this device has been demolished.

This just kills me, not because I wanted to use it, but because I wanted to see it.

(Laughter) One fine day, Alfred Kinsey decided to calculate the average distance traveled by ejaculated semen.

This was no mischievous curiosity.

Dr. Kinsey had heard that in the 1940s, the theory was circulating that the force with which semen was thrown into the cervix was a factor in fertility.

Mr. Kinsey thought it was a bunk bed, so he got down to business.

He gathered 300 men, tape measures, and movie cameras in his lab.

(Laughter) And in fact, in three-quarters of the men, I noticed something hanging down.

It wasn't ejected, thrown, or ejected with great force.

But the record holder impressively landed just short of the 8-foot mark.

(Laughter) (Applause) Yes. that's right.

(Laughter) Unfortunately he is anonymous. his name is not mentioned.

(Laughter) Kinsey writes in his book about this experiment that "two sheets were put down to protect the oriental rug."

(Laughter) This is my second favorite line in all of Alfred Kinsey's work.

My favorite is "A piece of cheese spread in front of a pair of mating mice distracts the female but not the male."

(laughs) Thank you very much.

(Applause.) Thank you!

Shah Rukh Khan: Whether it's Mumbai, Delhi, Chennai or Kolkata, our big cities have one thing in common. It's about welcoming people from small places looking for work.

It is also true that this warm welcome has consequences.

In these cities, problems such as housing will arise.

We have Dr. Gautam Ban, an expert and researcher of human settlements, with us today. He is rethinking solutions to this growing problem.

He will tell us the new look of the Indian city he saw.

TED Talks India New Thoughts with Dr. Gautam Ban.

Doctor. Gautam Ban, folks.

(Applause.) Gautam Baan: In this country, until a few years ago, if you asked someone, "Where are you from?"

The answer is Delhi, Mumbai and Kolkata.

You will soon ask again, "Where do you belong?"

Until recently, no one in India was from the city. People migrated only to cities.

This is changing.

Urbanization is changing India, are our cities ready?

Let's assume you were born in another place.

Your parents worked as laborers all day long.

Then you too have come to the city in search of progress.

Or maybe you were born in that city, as it is today.

One day you go out looking to buy or just rent accommodation in the city.

Can you find an affordable home?

The government says there is a shortage of at least 20 million homes.

20 million households, or 100 million people.

And this is no shortage of <i>three BHKs</i> (kitchen in bedroom hall).

95% of the shortage are people with a monthly income of Rs 10-15,000.

Can you find an affordable home within this budget?

What would you do if this happened to you?

A home is not a car or jewelry.

A home is food and clothing.

No one can live without it.

If you can't find a home to buy or rent in the city, you'll be forced to do what most people do eventually.

Build a house as much as possible.

You will also <i>settle</i>. The government may continue to call it the <i>Slum</i>, but I, like the people who live there, call it a settlement.

100 million people are not homeless.

they have a house

The house they built themselves.

However, most of these houses are within settlements.

This is the truth about affordable housing in India.

Village houses are cheap, but not sturdy.

The house outside is sturdy, but not cheap.

(Applause.) From here we must lay the foundation for new thinking.

Reconciliation is not the issue. that's the solution.

It just needs to be made safe and sturdy.

We cannot and do not need to build 20 million 25-square-foot apartments to meet the housing shortage of 20 million.

For example, consider the government of Karnataka.

They have a very good record in this regard.

By 2020, Karnataka needs 2.6 million homes.

Over the past decade, they have successfully built 350,000 homes.

Even if the government works in good faith, it will not be able to meet this need in the next few lives.

If you don't build a new house, what's your next solution?

How can I secure my payments?

First, we need to stop the eviction.

Bulldozer construction must stop.

It has never brought progress, nor will it ever.

(Applause.) We must begin to believe that the workers who build and run cities have a right to the land in those cities.

(Applause.) I know you think reconciliation will happen in illegally occupied lands, but land occupancy never happens in the middle of the night.

Settlements cannot be secretly formed, regardless of whether the land is governmental or not.

People have lived here for ages.

The government also agrees that our urban settlements have been around for 10, 20, 30 or even 40 years or more.

What kind of land is this squattered land, neglected for 30 years and then suddenly declared illegal to evict?

A settlement can easily accommodate 15-60% of a city's population while only using 1, 2, or up to 10% of the land.

How could so many people not have rights to this little piece of land?

A city's progress is often measured by land prices.

What do you think the cost of living for people living on the land will be?

Settlement doesn't mean a shiny house. All you need is basic necessities like electricity, roads, water, toilets and drainage.

This is called an <i>upgrade</i>. Here is an example of an upgrade:

Ahmedabad has launched a program that promises 44 settlements not to be displaced for 10 years.

Just a promise.

Nothing written, no documents.

And basic necessities were provided for them.

Over the course of a decade, that slum turned into its own neighborhood, place, and world.

The government didn't have to build any new houses.

(Applause.) Thailand launched this program on a national scale, benefiting 100,000 people in 137 cities.

And everyone was given the right to live on that land.

But be careful here.

Not the right to sell, but the right to live, use and settle there.

The whole world now knows that we cannot clear settlements in order to move forward.

You can only move forward if you think about how to make your settlement safe and secure.

But only one.

Knowing that, why doesn't it happen?

Applying this new way of thinking to reconciliation requires that we, you and I, look deep within ourselves and remove the hatred, contempt, and insecurities we carry.

Actually, I shouldn't have stood in front of you today.

The villagers who live there should be standing here.

But if such a person were to come here, you wouldn't listen to him.

You're listening to me because you think I'm not from the Settlement.

This is the mindset that needs to change.

thank you.

(Applause) SRK: Thank you. Thank you Dr Gautam Ban.

Thank you very much.

teach me please. I used the example of Thailand earlier, but the important thing is that houses are for people to live in, not for sale.

Not for commercial use.

Are there similar thought processes and programs in our country inspired by the stories of you and those around you?

GB: I wouldn't say it, but by a movement of people fighting for their rights in the city.

That's what makes the difference.

For example, in Orissa, Chief Minister Patnaik announced the same plan. All people in a settlement have rights to the land.

(Applause.) And I don't think this plan should be called populism. It should be called an economic development strategy.

Because economic development happens from below, not from above.

(Applause) SRK: I also promise to never talk about the slums again, only about the settlements. 100 percent.

(Applause.) Dr. Bang, you came here and said something so wonderful.

There is a song I don't sing because I'm a terrible singer.

GB: I'm also a terrible singer.

SRK: But we're saying great things, so we can't keep quiet.

(Laughter) So I'll just say that.

Slowly your mind will calm down.

GB: Slowly the mind calms down.

SRK: Only then will life be filled with love and good times.

(Applause) Ladies and gentlemen, Dr. Gautam Ban. thank you.

(Thank you for applause.

(applause)

I can't help but have this wish. Think about when you were little and all your friends asked you, "If a genie could grant you one wish in the world, what would it be?"

And I always answered, "Well, I want wisdom to know exactly what to ask for."

Then you will be screwed because you know what to wish for and run out of wishes. And now that we only have one wish -- unlike last year, they had three -- I'm not going to make that one.

Let's aim for the world peace that I want.

And I know what you're thinking: You're thinking, "Poor girl there, she thinks she's in a beauty pageant.

not her She has won a TED Award. ”

(Laughs) But I think it really makes sense.

And I think that the first step to world peace is for people to meet.

Over the years, I have met a wide variety of people and photographed some of them, from a New York dot-com executive who wanted world domination to a military spokesman in Qatar who didn't want world domination.

If you've seen the movie Control Room that was sent to you, you know a little bit about why.

(Applause.) Thank you.

oh! Some of you have seen it. That is wonderful. That is wonderful.

Basically, what I want to talk about today is about the way people travel and meet people in different ways. Because you can't travel all over the world at the same time.

And a long time ago, no, about 40 years ago, my mother had an exchange student.

And I will show you the exchange student slides.

I'm Donna.

This is Donna, the Statue of Liberty.

This is my mother and aunt teaching Donna how to ride a bike.

This is Donna eating ice cream.

This is Donna teaching her aunt Filipino dance.

I really think that as the world gets smaller, it becomes more and more important for us to learn each other's dance moves, to meet each other, to find ways to cross borders, to understand each other, to understand people's hopes and dreams, what makes them laugh and cry.

And we know that not everyone can participate in an exchange program, and we can't force everyone to travel. I've already spoken to Chris and Amy about it, and they said there's a problem with this, you can't force free will on people.

I fully support it, so I'm not going to force people to travel.

But I would like to talk about another way of traveling that doesn't require a ship or plane, just a movie camera, projector and screen.

That is what I am going to talk to you about today.

You asked me to tell you a little bit about where I come from personally, Cameron, I don't know how you got out of that situation, but given where I come from, I think building bridges is important to me.

I am the daughter of an American mother and an Egyptian-Lebanese-Syrian father.

In other words, I am a living product of the fusion of two cultures.

No kidding.

(Laughter.) And as an Egyptian-Lebanese-Syrian American with a Persian name, I've also been called the "Middle East Peace Crisis."

So maybe I started taking pictures as a way to bring both sides of the family together, a way to bring the world together, a way to visually tell a story.

That's how it started, but I think it was around the age of 16 that I first realized the power of images when I went to a garbage collection village in Egypt for the first time.

She is a strong believer in community service and decided this was what I needed.

There was a center there that taught people how to read and write, and vaccinated them against many of the diseases they could get from sorting garbage.

And I started teaching there.

I was teaching English and met some wonderful women there.

I have met people who live with strength of mind, sense of humor, and incredible qualities, even though they live seven people in one room and barely have time to eat dinner.

I was drawn into this community and started taking pictures there.

I took pictures of things like weddings and things I wanted to keep as memories for older family members.

About two years after I started taking these photos, the United Nations Conference on Population and Development asked me to show them at their conference.

So I was 18. I was so excited.

It was my first photo exhibition, but they were all on display, but after about two days, all but three were removed.

People were very upset and very angry that I showed the dirty side of Cairo. Why didn't I cut the dead donkey out of the frame?

And as I sat there, I felt very depressed.

I saw three lonely pictures on this big, empty wall, and I thought, 'This is a mistake,' because they were so pretty.

But I was seeing this intense emotion and intense feeling coming out of people who saw these photos.

I was here, this 18-year-old pipsqueak that no one listened to, and all of a sudden I had these pictures stuck on the wall, and an argument arose and they had to be taken down.

And then I saw the power of that image, and it was incredible.

And I think the most significant reaction I saw there was from people who would never have actually gone to the garbage village, who would have never seen that the human spirit can thrive in such a difficult situation.

And I think at that point I decided that I wanted to use photography and film in some way to bridge the divide, to bridge cultures, to bring people together, to cross borders.

I worked for MTV, made a movie called Startup.com, and did some music movies.

But in 2003, when the Iraq War was about to start, it felt very surreal to me. Because there was something like a media war going on before the war started.

And as I was watching TV in New York, only one point of view seemed to come through, with coverage ranging from the US State Department to embedded units.

And the news was that there would be clean war and precision bombing, Iraqis would welcome the Americans as liberators and throw flowers at their feet in the streets of Baghdad.

And I knew there was an entirely different story going on in the Middle East, where my parents were.

I knew it was a completely different story, and I was thinking, 'How do people communicate when they're getting a completely different message and no one knows what they're saying?

How can people come to a common understanding and know how to work together for the future?

So I knew I had to go there.

I just wanted to be centered.

We had no plans. I didn't have the money.

At that time, I didn't even have a camera. I had someone bring my camera because I wanted access to Al Jazeera, President George Bush's favorite channel. Al Jazeera was a place I was very interested in because it was hated by many governments in the Arab world and was even called the mouthpiece of Osama bin Laden by some in the US government.

So I was thinking that this station, hated by so many people, must be doing something right.

I have to go see what this is all about.

I also wanted to go to the Central Command, which is 10 minutes away.

In doing so, we were able to access how this news was produced, whether it reached the Arab world on the Arab side or reached the United States on the American and Western sides.

And when I went there and sat there and met the people at the center of it and sat with the characters, I met amazing, very complicated people.

And I want to share a little bit of my experience when I sit down with someone, film them, listen to them, and allow audio longer than 5 seconds.

It reveals the amazing complexity of human beings.

Samir Qadar: As usual.

Iraq, and Iraq, and Iraq.

But between you and me, if Fox offers me a job, I'll take it.

To turn the Arab nightmare into the American dream.

I still have that dream.

Maybe I can't do it, but I have a plan for my children.

After they graduate from high school, I plan to send them to study in America.

and they will stay there.

Josh Rushing: The night Al Jazeera showed prisoners of war and dead soldiers was intense because America doesn't show footage like that.

Most American news doesn't show really gory footage, but this one showed uniformed American soldiers strewn across the cold tile floor.

And it was defiant.

It was really rebellious.

My stomach hurt.

What surprised me there was that the night before there had been some sort of bombing in Basra and Al Jazeera had put out a video of people.

And it was just as terrifying, if not more. So was the image.

And I remember seeing it in the Al Jazeera office and thinking,

That's not good. "

Then go out and maybe have dinner or something.

So the shock to me, realizing that I was just looking at the people on the other side, upset me on a deep level that those in the Al Jazeera office must have felt the same way I was feeling that night, not as much as the night before.

It makes me hate war.

But I don't think we are still in a world where we can live without war.

I didn't know if I could escape from there.

We didn't have the funds for that.

And when we screened the film in both America and the Arab world, the response was incredible.

It was amazing to see how moved people were by this movie.

In the Arab world, it's not really due to the film, it's due to the characters, but I mean, Josh Rushing was an incredibly complicated person to think things through.

And when we showed the movie in the Middle East, people wanted to meet Josh.

He redefined us as American citizens.

People started asking me, "Where is this person now?"

Al Jazeera offered him a job.

(Laughter) On the other hand, Samir was also a very interesting character for the Arab world. Because it highlights the complexity of the love-hate relationship between the Arab world and the West.

In America, I was amazed at the motivation and positivity of Americans who saw this film.

As you know, we are criticized abroad for believing that we are in some ways the savior of the world, but on the flip side, when we see what is really happening abroad and how people react to our policies abroad, we feel this power and we feel the need to do so. I feel that I must acquire the power to change things.

And I saw this with an audience.

This woman came to me after the screening and said:

We've seen bombs on planes, we've seen armies go to war, but you don't know people's anger against us until you see people in hospitals and the casualties of war. How do we get out of this bubble?

How can we understand what the other person is thinking? ”

I don't know if movies can change the world.

But I know its power, and I know it inspires people to think about how they can change the world.

Now, I'm no philosopher, so I don't think I need to go too deep into this, but let the film speak for itself and take you into this other world.

I believe that movies have the power to take you across borders, so I'd like you to sit back and experience the few minutes that take you to another world.

These few clips will take you inside two of the most difficult conflicts facing us today.

[The last 48 hours of two Palestinian suicide bombers. ] [Paradise Now] [Male: As long as there is injustice, someone must make the sacrifice!] [Woman: It's not sacrifice, it's revenge!] [Killing makes no difference between victim and occupier. ] [Man: If you have an airplane, you don't need a martyr, that's the difference. ] [Woman: The difference is the Israeli army is still strong. ] [Male: Then let's be equal in death. ] [We still have paradise. It exists only in your head!] [Man: God forbid it!] [May God forgive you. ] [If you're not the daughter of Abu Azzam...] [Anyway, I'd rather have paradise in my head than live in this hell!] [In this world, we're dead anyway. ] [ A man chooses bitter only when the alternative is even more bitter. ] [Woman: So what about us? [What's left? ] [So we can win? [Don't you see what you're doing is destroying us?] [And you mean giving Israel an alibi to continue?] [Male: So Israel will stop because there is no alibi?] [Woman: Probably. We must turn this into a moral war. [Male: If Israel has no morals, why?] [Woman: Watch out!] [And real people building peace through non-violence] [Encounter Point] Video: (Ambulance sirens) [Tel Aviv, Israel, 1996] [Zwika: My wife Aylette called and said] ["There was a suicide bombing in Tel Aviv."] [Aylette: What do you know about terrorism? Looking for 3 people] [no information] [Aylett: 1 injured here, no word from the other 3] [Tuvika: I said, ``Okay, that's Batchen, that's my daughter.] [Is she really dead? Around 30:00] [I was driving to the supermarket with my wife and daughters. ] [When I got here…] [I saw three Israeli jeeps parked on the shoulder. ] [As we passed the first jeep…] [They opened fire on us. ] [and my twelve-year-old daughter Christine] [also died in the shooting. ] [Jerusalem Family Forum] [Zvika: I am the principal of all parts. [George: But do you have a teacher?] [Zwika: Yes, I have an assistant. ] [I am always in contact with children. ] [A year after their daughter's death, Tzwika and George both join the forum] [George: At first, I thought it was a strange idea. ] [But after thinking logically, I found no reason not to see them] [and made them aware of our affliction. ] [Zwika: There were a lot of moving moments. ] [We learned that there are Palestinians who have suffered a lot and lost their children] [and still believe in the peace process and reconciliation. ] [If those of us who have lost the most precious thing can talk to each other] [and look forward to a better future] [then others must too. ] [From South Africa: Revolution Through Music] [A mandla] (music) (video) Man: Songs are what we have communicated with people who otherwise would not have understood where we came from.

Give them a long political speech and they will still not understand.

But I'm telling you, when that song is over, people will say, 'Damn you guys know where the black people come from.

I know where you guys come from.

Narrator: It's about the liberation struggle.

It depicts children taking to the streets shouting "Free Nelson Mandela!"

It's a story about trade unions who gave up their means and demanded their freedom.

yes. yes!

(music and song) (song) Freedom!

(Applause.) Jehane Nowjaim: I think we all have experienced the feeling, and the transformation, of sitting in a dark room in a theater with other strangers watching a very powerful movie.

And what I want to talk about is how can we use that emotion to actually create movement through film?

I've been listening to a talk at a conference, and Robert Wright said yesterday that if we value other people's humanity, they'll also appreciate us.

That's the story of this.

Bringing people together through film and spreading independent voices.

Well, Josh Rushing actually quit the military and got a job with Al Jazeera.

(Laughter.) I mean, he feels that he's in Al Jazeera International because he feels that he can actually use the media to bridge the gap between the East and the West.

That's amazing.

But I've been thinking about how to empower these independent voices, how to empower filmmakers, how to empower people who want to use film to make a difference.

And there are already great organizations doing this.

There is a witness that I heard about earlier.

Working with Palestinians and Israelis working together for peace, documenting the process, being interviewed, and taking this film to parliament to show that this film is a powerful tool, that this is a woman whose daughter was killed in an attack, and that she believes there is a peaceful way to resolve this issue.

We have Working Films and Current TV, which is a great platform for people from all over the world to submit their work -- (Applause) Yes, that's great.

I watched it and was struck by its potential and its potential to bring in voices from all over the world, independent voices from all over the world, to create a truly democratic and global television.

So what can we do to create a platform for these organizations, create some momentum, and get everyone in the world involved in this movement?

Imagine for a moment.

Imagine a day when everyone from all over the world gathers.

There are towns and villages and theaters where people from all over the world come together to sit in the dark and share the communal experience of watching a movie or two together.

Watch movies that spotlight characters who are fighting for their lives, or defying stereotypes, joking and singing.

Comedies, documentaries, short stories.

This amazing power can be used to change people and bring people together. To make people feel like they are having a shared experience across borders.

So imagine today when there are theaters and places to screen movies all over the world.

Imagine the same movie being projected in Ramallah and the same movie being projected in Jerusalem, from Times Square to Cairo's Tahrir Square.

You know, we were talking with friends about taking advantage of the Great Pyramids and the Great Wall side.

Whether it's a place where a movie can be screened or a communal experience, the possibilities are endless.

And if we can create that, I believe that one day we can create momentum for all these independent voices.

There is no organization uniting and promoting the independent voices of the world. Still, through this conference, I hear that the biggest challenges for our future are understanding each other, respecting each other, and crossing borders.

And if movies allow that and if we can see these movies together in different parts of the world, then this would be a great day.

So we already have a partnership, and through a guy named John Cammen from the TED community, he introduced me to Steven Upcon at the Jacob Burns Film Center.

And we started calling everyone.

And in the last week, so many people have responded to us from Palo Alto to Mongolia to India.

There are people who want to participate in this global film day. So that we can provide a platform for independent voices and independent films to emerge.

Now that I have come up with a name for this day, I would like to share it with all of you.

Now, the most amazing part of this whole process is sharing ideas and wishes. So I want you to brainstorm how this day will be reflected in the future.

How can we use technology to reflect this day into the future, building communities through the internet and enabling those communities to work together?

Many years ago there was a time when all continents were stuck together.

And we call that continent Pangea.

So I would like to call this cinema day "Pangea Cinema Day".

And I think we can really start a movement for people to understand each other better, just by imagining all the people in these towns are watching.

I know it's very intangible and it touches people's hearts and souls, but the only way I know how to do it, the only way I know how to reach out to someone's heart and soul in the world, is to show a movie.

And I know there are independent filmmakers and films out there that can actually do this.

And that is my wish.

I would like to make a single wish, but I'm running out of time.

Chris Anderson: That's an incredible wish.

Pangea Cinema: The day the world becomes one.

JN: It's more concrete than world peace and definitely more direct.

However, the day will come when the world will become one through the power of movies.

CA: Ladies and gentlemen, Jehane Noujaim.

A mother and son travel through the endless desert.

Travelers don't have to worry about dying of thirst, wearing special suits that fit close to the skin to dissipate heat and recycle moisture.

Their fear is much greater.

The two try to walk without breaking the rhythm, blending the vibrations of their footsteps with the movement of the sand.

But soon the sound of the desert is drowned out by a louder whoosh.

Their unnatural gait turned into a sprint as the mound of sand rolled toward them.

As a 400-meter-long sandworm erupts from the desert floor, the two scramble onto a nearby rock wall.

This is the world of "Dune".

Written by Frank Herbert and published in 1965, Dune is set in the distant future, when humans rule the planets of a vast feudal empire.

This medieval motif is not limited to government.

Unlike most interstellar sci-fi, Herbert's humans conquered the stars without a computer.

After the war with the ancient robots, mankind banned the construction of machines "resembling the human mind". But rather than curb human expansion, this edict allowed humanity to evolve in surprising ways, becoming biological computers, psychic witches, and visionary space pilots.

Members of these super-powered factions are regularly employed by various noble families, all competing for power and new planets to add to their kingdom.

But most of these superhuman skills rely on the same precious resource: spice.

Also known as "melange," this mystical crop is essential to any space travel and is the cornerstone of the galactic economy.

And it grows only on the desert planet Arakis. Arakis is a dangerous and harsh world where the natives have long rebelled against the Empire.

Arrakis, also known as the Dunes, is the setting for Herbert's novel, which follows Paul of the aristocratic Atreides family.

The book opens with Paul's family assigned control of Dune as part of an elaborate conspiracy by their sworn enemies, the sadistic slave drivers of House Harkonnen.

These conflicts between the two chambers upset Arrakis' delicate political balance.

Soon, Paul finds himself in the middle of a planetary revolution where he must prove himself capable of leadership and survival in this hostile desert world.

But Arrakis is more than just an endless sea of ​​sand.

Herbert is a passionate environmental activist who spent more than five years building Dune's complex ecosystem.

The planet is checkered with climate zones and wind tunnels that have shaped the rocky terrain.

Different temperate zones have different desert flora.

And nearly every element of the Dune ecosystem works together to produce the planet's vital exports.

Herbert's worldbuilding also contains a rich web of philosophy and religion.

Paul's mother Jessica is a member of the Bene Gesserit, an ancient cult of spice-using psychics.

The Bene Gesserit, sometimes called "witches" for their mystical powers, have operated as a shadow government for thousands of years to guide society toward enlightenment.

Similarly in antiquity there are Mentat, human computers capable of processing incredible amounts of data.

Mentat is a bastion of logic and reason, but the result is not just a calculation, but an ever-changing stream of possibilities.

But no group is more central to Dune than the Fremen.

Natives of Arrakis, they are the keepers of the Earth's many secrets.

Paul's journey takes him deep into the Fremen's exclusive Brotherhood, where he must prove himself trustworthy in a series of increasingly dangerous challenges.

All these factions have deep histories that permeate the text, and Herbert incorporates that sense of scale into the structure of the book as well.

Each chapter begins with a quote from a futuristic history book, reminding you of elements of the events yet to unfold.

The book also includes an in-universe appendix that further explores the history of the empire. Alongside a glossary of words such as "gom jabber" and "shai khurud".

The epic story of Dune unfolds across six books spanning thousands of years.

But all future tales of Arrakis begin here. It's time for Paul to pursue a dangerous, difficult, and ever-present storm that threatens to overwhelm him.

Two years ago, I reported here at TED that the Cassini spacecraft on Saturn discovered an unusually warm and geologically active region at the southern tip of the small Saturnian moon Enceladus seen here.

The region was first identified in Cassini images taken in 2005. This is the Antarctic region, and the famous tiger-striped fissure cuts across Antarctica.

And just recently, sighted in late 2008, the area reappeared here. The southern hemisphere is now half dark as it is the beginning of August and then winter.

And I also reported that we made this amazing discovery. A once-in-a-lifetime discovery of a towering jet erupting from a fissure in Antarctica. The jets consist of small water ice crystals accompanied by water vapor and simple organic compounds such as carbon dioxide and methane.

And then, two years ago at the time, we said we speculated that these jets were actually geysers, erupting from pockets or chambers of liquid water below the surface, but we weren't really sure.

But the implications of those results—the chemistry of prebiotics, and perhaps the potential of the environment within this moon to support life itself—were so exciting that in the intervening two years, we focused more on Enceladus.

We have flown the Cassini spacecraft several times near the Moon, flying closer and deeper to these jets and into the denser regions of these jets. The result was a highly accurate compositional measurement.

And it turns out that the organic compounds coming from this moon are actually more complex than those previously reported.

These are not amino acids, but propane, benzene, hydrogen cyanide, formaldehyde, etc. have now been found.

And the tiny water crystals here are searching the world like frozen drops of salt water. This is a finding that suggests that not only is the jet emanating from a pocket of liquid water, but that liquid water is in contact with the rock.

And it's the conditions that can supply the chemical energy and compounds needed to sustain life.

We are therefore very encouraged by this result.

And we are much more confident now than two years ago that there may indeed be a habitable environment or zone under the South Pole of the Moon.

Of course, whether or not there's life there is another story altogether.

And that will have to wait, hopefully in the near future, for a spaceship specially equipped to address that particular question to arrive on Enceladus.

But in the meantime, imagine the day we travel to the Saturn system and visit the Enceladus Planetary Geyser Park.

thank you.

(applause)

In the 4th century BC, the son of a banker scandalized the city of Sinope by counterfeiting coins.

When things finally came to an end, this young man, Diogenes of Sinope, was stripped of his citizenship, money, and all his possessions.

At least, that's how the story goes.

Although many of the details of Diogenes' life have been shrouded in darkness, the philosophical ideas that emerged from his humiliation survive today.

While in exile, Diogenes decided that he could be truly free by rejecting the opinions of others and society's standards of success.

He will live self-sufficiently, close to nature, without materialism, vanity and conformity.

In practice, this meant that he spent years roaming the Greek cities with nothing but a cloak, a cane and a knapsack, refusing technology, baths and cooked meals, spending all year outdoors.

He did not turn a blind eye to this new presence, and is said to have teased passers-by, mocked those in power, and even ate, urinated, and even masturbated in public.

Residents called him Kyon, which means barking dog.

The dog was meant as an insult, but was actually a good symbol of his philosophy. Dogs are happy creatures free from abstractions such as wealth and reputation.

Diogenes and his followers became more and more known as "the dog philosopher" or kinikoi, a designation that eventually became the word "cynic". These early cynics were a free-spirited bunch, drawn to the freedom of a nomadic lifestyle.

As Diogenes' reputation grew, others sought to challenge his commitments.

Alexander the Great offered whatever he wanted.

But instead of asking for supplies, Diogenes only asked Alexander to escape the rays of the sun.

After Diogenes' death, followers of his philosophy continued to call themselves Cynics for about 900 years, until 500 AD.

Some Greek philosophers, like the Stoics, thought everyone should follow Diogenes' example.

They also tried to weaken his philosophy for acceptance by conventional society, which, of course, was fundamentally at odds with his approach.

Some did not look at the cynic with such a benevolent eye.

In the Roman province of Syria in the second century AD, the satirist Lucian portrayed the contemporary Cynics as unprincipled, materialistic, self-promoting hypocrites who merely preached what Diogenes once practiced in practice.

Centuries later, Renaissance and Reformation writers who read Lucien's writings called their rivals cynics as an insult. By that I mean people who criticize others without having anything worth saying.

This usage eventually laid the foundation for the modern meaning of the word "cynic." A "cynic" is someone who thinks others are acting out of pure self-interest, even if they claim higher motives.

Still, the ironic philosophy had its admirers, especially among those who wanted to question the status quo of society.

The 18th-century French philosopher Jean-Jacques Rousseau was called "neo-Diogenes" because he argued that art, science, and technology corrupt man.

In 1882, Friedrich Nietzsche revisited the story of Diogenes carrying a lantern into the Athenian market, searching in vain for an honest man.

In Nietzsche's version, so-called madmen storm the town square and declare that "God is dead." This was Nietzsche's way of calling for a "re-evaluation of values" and rejecting the dominant Christian and Platonic ideas of universal and spiritual insight beyond the physical world.

Nietzsche admired Diogenes' stubborn fixation on the 'here and now'.

More recently, 1960s hippies have been compared to Diogenes as counterculture rebels.

Diogenes' ideas have been adopted and rethought many times.

Original cynics may not have approved of such a novel interpretation. They rejected custom and believed that their values ​​of living in close proximity to nature were the only true values.

Whether you agree with that, or with subsequent incarnations, they have one thing in common. That is, they questioned the status quo.

This is an example that we can still emulate. Instead of blindly following conventional or majority views, think about what really counts.

Forrest North: Collaboration starts with a conversation.

And I want to share with you some of the conversations we started.

I grew up in a log cabin in Washington State on my spare time.

Yves Béhar: And for me it's scenic Switzerland.

FN: I've always had a passion for alternative vehicles.

This is a land yacht sailing through the Nevada desert.

YB: The combination of windsurfing and skiing is included in this invention.

FN: I was also interested in dangerous inventions.

This is the 100,000 volt Tesla coil I built in my bedroom, much to my mother's disappointment.

YB: Unfortunately, my mother, this is just dangerous teenage fashion.

(laughter) FN: And I've combined all this, this passion with alternative energy, and raced solar cars across Australia and even across the US and Japan.

YB: There were a lot of things I wanted to talk about about wind power and solar power.

There was a lot to get us excited about.

So we decided to do a special project together.

To combine engineering and design...

FN: Let's build beautiful products that are truly fully integrated.

YB: And we made a baby.

(laughter) FN: Can you bring the baby?

(Applause) This baby is completely electric.

Go at 150 mph.

The cruising range is twice that of an electric motorcycle.

What's really exciting about motorcycles is the beautiful integration of engineering and design.

It provides a great user experience.

Working with Yves Behar was great.

He came up with our name and logo. We are Mission Motors.

We only have three minutes, but we could talk about it for hours.

YB: Thank you.

FN: Thank you, TED. And thank you, Chris, for inviting us.

(applause)

This chimpanzee stumbled across an overripe plum by chance.

Many of them were cracked open and he was drawn to their enchanting fruity scent.

As he devours it, he begins to experience some… strange effects.

This ignorant monkey encountered the process that humans ultimately utilize to make beer, wine, and other alcoholic beverages.

The sugars in overripe fruit attract microorganisms known as yeast.

Yeast eats fructose to produce a compound called ethanol (a type of alcohol found in alcoholic beverages).

This process is called fermentation.

No one knows exactly when humans started making fermented beverages.

The earliest known evidence dates back to 7,000 BC in China, where clay pot remains reveal that people fermented rice, millet, grapes and honey to make an alcoholic beverage.

Within thousands of years, cultures around the world began fermenting their own drinks.

The ancient Mesopotamians and Egyptians made beer year-round from stored grain.

This beer was available to all social classes and workers received it as their daily food.

They also produced wine, which was a rare and expensive delicacy as the climate was not optimal for growing grapes.

By contrast, in Greece and Rome, where grapes were easy to grow, wine was as readily available as beer in Egypt and Mesopotamia.

Yeast ferments basically any plant sugar, so the ancients made alcohol from any crop or plant that grew where they lived.

In South America, people made chicha from grains, sometimes adding hallucinogenic herbs.

Pulque, made from cactus sap, was the main drink in present-day Mexico, while East Africans made banana and palm beer.

And in the area that is now Japan, people made sake from rice.

Almost every region on earth had its own fermented beverage.

As alcohol consumption became a part of everyday life, some authorities clung to the effects they perceived as positive, such as believing wine was good for health and poets attesting to the creative qualities of wine.

Some are more concerned about the abuse potential of alcohol.

Greek philosophers encouraged temperance.

Early Jewish and Christian writers in Europe incorporated wine into their rituals, but considered excessive drunkenness a sin.

And in the Middle East, Africa, and Spain, Islamic rules for praying while drinking have gradually solidified into a general ban on drinking.

Ancient fermented beverages had relatively low alcohol content.

At about 13% alcohol, the by-products produced by wild yeast during fermentation become toxic and kill the yeast.

When the yeast dies, fermentation stops and the alcohol content drops.

So for thousands of years the alcohol content was limited.

This situation changed with the invention of a process called distillation.

A 9th-century Arabic text describes boiling the fermented liquid to evaporate the alcohol in it.

Alcohol boils at a lower temperature than water, so it evaporates first.

Capturing and cooling this vapor leaves behind a liquid alcohol that is far more concentrated than any fermented beverage.

Initially, these stronger spirits were used for medicinal purposes.

Distilled spirits then became an important traded commodity because unlike beer and wine, they do not spoil.

Rum, made from sugar harvested in European colonies in the Caribbean, became a staple for sailors and was traded to North America.

Europeans brought brandy and gin to Africa, exchanging them for enslaved people, land, and commodities such as palm oil and rubber.

In these regions, spirits became a form of money.

During the Age of Discovery, spirits played an important role in long-distance voyages.

With voyages from Europe to East Asia to the Americas sometimes taking months, it was difficult to keep water fresh for the crew.

Alcohol has preservatives that kill harmful microbes, so adding a bucket of brandy to a barrel of water will keep the water fresher longer.

So by the 1600s, alcohol had gone from merely stimulating animals to facilitating global trade and exploration, with all the consequences.

Over time, its role in human society becomes even more complex.

I am here because I have a very important message. I think I have found the most important factor for success.

And it was found here near Stamford.

A psychology professor took four-year-olds and locked them in their own room.

And he said to that kid, a four-year-old, "Johnny, I'm going to leave you here with the marshmallows for fifteen minutes.

After I come back, if this marshmallow is here, I can get another marshmallow. Then there will be two. ”

Saying to a 4-year-old, "Please wait 15 minutes, I have something you'd like," is the same as saying to us, "I'll have your coffee in two hours."

(Laughter) Exactly the same.

So what happened after the professor left the room?

The moment the door closes...

2 out of 3 ate marshmallows.

5 seconds, 10 seconds, 40 seconds, 50 seconds, 2 minutes, 4 minutes, 8 minutes.

Some of them lasted 14 and a half minutes.

(Laughter) I couldn't do that. I couldn't wait.

What's interesting is that 1 in 3 people look at a marshmallow and do this...

Let's see it.

Please put it back.

they were walking around. They played with skirts and pants.

Already at the age of four, the child understood the most important principle for success - the ability to delay gratification.

Self-discipline: The most important factor for success.

After 15 years, 14 or 15 years, follow-up.

what did they find?

They went looking for the children, now 18 and 19 years old.

And it turns out that 100 percent of the kids who didn't eat the marshmallows succeeded.

they were doing well. they were doing great.

they were happy they had a plan.

They had good relationships with teachers and students.

they were fine.

Most of the kids who ate marshmallows were in trouble.

They couldn't go to college.

Their grades were bad. Some of them were dropouts.

There were still a few people who did poorly.

Some were getting good grades.

In my mind, I wondered if Hispanic children would react in the same way as American children.

So I went to Colombia. I tried to reproduce the experiment.

And it was a lot of fun. I have used children aged 4, 5 and 6.

And let me show you what happened.

(Spanish) (laughter) So what happened in Colombia?

Two out of three Hispanic children ate marshmallows. One in three did not.

This little girl was funny. She ate the inside of the marshmallow.

(Laughter) In other words, she wanted us to think we weren't eating, so we got two.

But she ate it.

So we know she will succeed. But we have to keep an eye on her.

(Laughter) She shouldn't be going to the bank or working at the cash register, for example.

But she will succeed.

And this applies to all. Even in business.

A salesman whose customer says, "I want that." The man said, "Yes, please."

That person ate a marshmallow.

The salesman said, "Wait a minute."

Let me ask you a few questions to see if this is a good choice. ”

That way, you can sell more.

Therefore, it can be applied in any field.

Finally, this is what the Koreans did.

you know what? This is so good, I want a marshmallow book for children.

We made one for our kids. And now it has spread all over Korea.

They teach their children exactly this principle.

We have so much debt here in America that we need to learn the principles.

We eat more marshmallows than we produce.

Thank you very much.

Let's talk mania.

Let's start with Beatlemania.

(Recording of crowd roaring) Hysterical teenagers, crying, pandemonium.

(Recording crowd roar) Sportsmania: A deafening crowd, all for one idea: to get the ball into the net.

Now, religious buffs, there is rejoicing, there is crying, there is hallucination.

Mania might be good too.

Maniacs may be wary.

Or mania can be deadly.

(Audience cheering recording) There are more and more new maniacs in the world.

English learning mania.

Listen to Chinese students practicing shouting English. Teacher: ... change my life!

Students: I want to change my life!

T: I don't want to disappoint my parents!

S: I don't want to disappoint my parents!

T: I don't want to let my country down!

S: I don't want to let my country down!

T: Most importantly... S: Most importantly...

T: I don't want to let myself down!

S: I don't want to disappoint myself!

How many people in the world are trying to learn English?

That number is 2 billion.

Students: T-shirts. dress.

Jay Walker: Latin America, India, Southeast Asia and most of all China.

Chinese students are required by law to start studying English in the third grade.

That is why China will become the world's largest English-speaking country this year.

(laughs) Why English?

Opportunities to live and work better, pay for school, put better food on the table.

Imagine a student taking a ton of tests over three full days.

Her score on this one test will literally determine her future.

She studies 12 hours a day for three years to prepare.

25% of her grades are based on English.

Known as Gaokao, 80 million high school students in China have already taken the rigorous exam.

The intensity of learning English is almost unimaginable unless you experience it yourself.

Teacher: Perfect! Students: Perfect!

T: Perfect! S: Perfect!

T: I want to speak perfect English!

S: I want to speak perfect English!

T: I want to talk... S: I want to talk...

T: ...perfect English! S: ...perfect English!

T (yelling even louder): I want to change my life!

S (yelling even louder): I want to change my life!

JW: So are English geeks good or bad?

Is English a tsunami sweeping away other languages?

Unlikely.

Your native language is your life.

But with English, you can participate in a wider conversation – a global conversation about global issues like climate change, poverty, hunger and disease.

There are other universal languages ​​in the world.

Mathematics is the language of science.

Music is the language of emotion.

And now English is becoming a problem-solving language.

Not because America is pushing it, but because the world is pulling it.

In other words, English mania is a turning point.

Like the use of electricity in cities and the fall of the Berlin Wall, English represents hope for a better future, one in which the world has a common language to solve common problems.

thank you very much.

(applause)

This is my first trip and my first trip abroad as First Lady.

Do you believe that?

(Applause.) And although this is not my first visit to the UK, I have to say that I am delighted that this is my first official visit.

The special relationship between America and Britain

Seeing you today reminded me of that, which is based not only on relationships between governments, but also on the common language and values ​​we share.

During my visit, I have been particularly privileged to meet some of Britain's most outstanding women - women who are leading the way for you.

And it is an honor to meet you, the future leaders of the UK and of this world.

And while our life situations may seem so far apart, I want you to know that I am standing here as the First Lady of the United States and you just graduated from school, so we have so much in common.

Little did I know that in my career I would stand here as the first African-American First Lady of the United States.

Nothing in my story leads me here.

I didn't grow up with wealth, resources, or social status to say the least.

I grew up on the South Side of Chicago.

That's the real part of Chicago.

And I was a product of a working-class community.

My father was a city employee all his life, and my mother was a housewife.

And she stayed home to take care of me and my brother.

Neither of them attended college.

My father was diagnosed with multiple sclerosis in his prime.

But as I saw him struggle more and more as it became harder to walk and get dressed in the morning, he never complained about his struggles.

He was grateful for what he had.

He just got up a little earlier and tried a little harder.

And my brother and I were raised with everything we really needed: love, strong values, and the belief that nothing is impossible with a good education and hard work.

I am an example of what is possible when a girl is loved and nurtured by those around her from the beginning of her life.

Throughout my life, I have been surrounded by amazing women - grandmothers, teachers, aunts, cousins, neighbors - who have taught me about quiet strength and dignity.

And my mother, the most important role model in my life, lives with us in the White House and helps care for our two young daughters, Malia and Sasha.

She is an active presence in their lives as well as mine, instilling in them the same values ​​she instilled in me and my brother: compassion, integrity, confidence, and perseverance. They are all wrapped in the unconditional love that only grandmothers can give.

I have also been fortunate enough to be cherished and encouraged by strong male role models such as my father, brother, uncle and grandfather.

The men in my life have also taught me some important things.

They taught me what a respectful relationship between men and women should look like.

They taught me what a strong marriage looks like. It's built on faith, dedication, and admiration for each other's unique talents.

They taught me what it was like to be a father and raise a family.

And we need to not only invest in our own homes, but also help raise our children in the wider community.

And these were the same qualities I wanted in my husband, Barack Obama.

One of the things I remember when we first met was him taking me on a date.

And his date was supposed to go to community gatherings together.

(Laughter) I know, how romantic.

(Laughs) But when we met, Barack was a community organizer.

He helped people find jobs and sought to bring resources to troubled areas.

Talking to residents at the community center, he discussed two concepts.

He talked about "the world as it is" and "the world as it should be."

And I talked about this throughout the campaign.

He used to say that we accept that there is a distance between these two ideas.

And we can become complacent with the world as it is, even if it doesn't reflect our values ​​and aspirations.

But Barack reminded all of us in that room that day that he knew how the world should be.

We know what fairness, justice and opportunity look like.

we all know

And he urged people in that conference and community to focus on bridging the gap between these two ideas and work together to align the world as it is with the way it should be.

And I think about it today because I am reminded and convinced that everyone at this school is playing a very important role in closing that gap.

You are the women who build the world as it should be.

You will be writing the next chapter in history.

Not just for yourself, but for your generation and generations to come.

That is why getting a good education is so important.

That's why everything you're going through, the ups and downs, the teachers you like and dislike, that's why it's so important.

Because communities, countries, and ultimately the world become as strong as women's health.

And it's important to keep that in mind.

Good health also includes a good education.

The difference between a struggling family and a healthy family is often the presence of an empowered woman at the center of the family.

The difference between broken and thriving communities is often a healthy respect between men and women who appreciate each other's contributions to society.

The difference between a country in decline and one that will thrive is the recognition that boys and girls need equal access to education.

And the school, named after Britain's first female doctor, and the surrounding buildings named after Mexican artist Frida Kahlo, Jamaican nurse Mary Seacole, known as the "Black Florence Nightingale," and British author Emily Brontë, celebrate women who fought sexism, racism and ignorance, and pursued their passions to nourish their souls.

They allowed no obstacles.

The sign there read "No Limits".

They knew no other way to live than to follow their dreams.

And in doing so, they overcame many obstacles.

And they have opened many new doors for the millions of female doctors, nurses, artists and writers who have followed them.

And with a good education, you too can control your destiny.

Remember that.

If you want to know why I'm standing here, it's for education.

I never skipped classes. I'm sorry, but I don't know if anyone will skip class.

i have never done that.

I loved getting As.

I liked being smart.

I liked the punctuality. I loved getting the job done.

I thought being smart was the coolest thing in the world.

And you too can take control of your destiny with the same values.

You too can pave the way.

You too can make your dreams come true. Then your job is to help people just like you do the same.

History proves that it doesn't matter if you are from a municipal estate or a rural estate.

Your success depends on your own fortitude, your own confidence, and your own hard work.

That's true. That's the reality of the world we live in.

You are now in control of your own destiny.

And it's not easy, that's for sure.

But it has everything you need.

Everything you need to succeed is already here.

My husband works in this big office.

They call it the Oval Office.

The White House has a desk where he sits. It's called the "Resolute desk".

Built from timber from Her Majesty's ship Resolute, it was a gift from Queen Victoria.

It is an enduring symbol of friendship between the two countries.

And the name, "Resolute," is a reminder of the strength of character required not only to lead a nation, but also to live a life of purpose.

And I hope that in pursuing your dreams, you will remain resolute, push forward without limits, and use your talents. we've seen them It's there - you use them to create what the world should be.

Because we count on you.

We expect each and every one of you to perform at your best.

Because the world is big.

And it is full of challenges.

And we need strong, bright, confident young women to stand up and take the reins.

We know you can do it. we love you. Thank you very much.

(applause)

On a cold winter night in 1916, Felix Yusupov anxiously prepares to welcome his dinner guests.

If all goes according to plan, his guest will die by morning, but already four others have tried unsuccessfully to stop him.

The Russian monarchy was on the brink of collapse, and for Yusupov and his fellow aristocrats, the saint who invited them to dinner was the cause of everything.

But who was he? How could one monk be responsible for the fate of an empire?

Grigory Efimovich Rasputin was born in 1869 into a peasant family and began his life in Siberia.

Had he not converted to the Russian Orthodox Church in the 1890s, he might have lived an obscure life in a small village.

Inspired by humble monks who wandered endlessly from holy land to holy land, he spent years making pilgrimages throughout Russia.

During his travels, strangers were captivated by Rasputin's charming presence.

Some even believed he had mystical gifts of precognition and healing.

Despite Rasputin's heavy drinking, petty theft, and promiscuity, his reputation as a monk soon spread beyond Siberia, attracting both laity and influential Orthodox clergy.

Finally arriving in the capital, St. Petersburg, Rasputin used his charisma and connections to win the favor of the imperial spiritual advisor.

In November 1905, Rasputin was finally introduced to Tsar Nicholas II of Russia.

Nikolai and his wife Alexandra were ardent believers not only in mysticism and supernatural powers, but also in the Orthodox Church, but this Siberian saint nailed them.

It was a particularly turbulent time for Russia and her family.

After the revolution of 1905, the monarchy barely maintained control.

Their political struggle was only exacerbated by personal turmoil. The heir to the throne, Alexei, had a life-threatening blood disease called hemophilia.

When Alexei had a serious medical crisis in 1912, Rasputin advised his parents to refuse medical attention.

Alexei's health improved, reinforcing the royal belief in Rasputin's magical healing powers and securing a privileged position at the royal court.

Today we know that doctors prescribed aspirin, a drug that made hemophilia worse.

After this incident, Rasputin made a prophecy. If he died or the royal family abandoned him, their son and crown would soon be lost.

Non-royal people had different opinions about Rasputin.

On the one hand, the peasants saw him as their ally, amplifying an unheard voice against the monarchy.

However, the nobility and the clergy came to despise his presence.

Rasputin never stopped his scandalous acts, so they were skeptical of his so-called power and thought he was corrupting the royal family.

By the end of World War I, they were convinced that the only way to maintain order was to eliminate this saintly guise.

With this conviction, Yusupov began planning to assassinate Rasputin.

The exact details are still shrouded in mystery, but the best guess as to how it all unfolded comes from Yusupov's memoirs.

He offered Rasputin many pastries, believing them to contain cyanide.

However, unbeknownst to Yusupov, one of the conspirators had a change of heart and replaced the poison with a harmless substance.

To Yusupov's surprise, Rasputin had no ill effects from eating them.

In desperation, he shot Rasputin at point-blank range.

However, Rasputin recovered, beat the attackers and fled.

Yusupov and his accomplices pursued Rasputin, eventually killing him with a bullet to the forehead and dumping his body in the Malaya Nevka River.

But Rasputin's death, far from stabilizing the monarchy's authority, infuriated the peasants.

As predicted by Rasputin, his murder was soon followed by the murder of the royal family.

Whether the fall of the Russian monarchy was the product of a monk's curse, or the result of decades of political tension, we may never know.

All human life, all life depends on plants.

I hope you can convince me of that in a few seconds.

Let's think about it.

It doesn't matter if you live in a small African village or in a big city. Whether it's food, medicine, fuel, construction, clothing, or all the other obvious things, everything eventually comes back to plants. Or whether it is for spiritual or recreational purposes that are of great importance to us. Soil formation, atmospheric impact, primary production, etc.

Damn, the books here are also made of plants.

All this comes back to the plant.

And without them we wouldn't be here.

Plants are now under threat.

They are threatened by climate change.

And because they share the planet with people like us, they are also under threat.

And humans like us want to do things that destroy plants and their habitats.

And whether it's for food production, the introduction of exotic plants where they shouldn't be, or the habitat being used for other purposes, all of this means that plants must adapt, die, or move.

Plants can also be quite difficult to move around as cities and other things can get in the way.

So if all human life depends on plants, perhaps it makes sense that we should try to save them?

I think so.

And I would like to talk about a project to save plants.

And the way to save plants is to store seeds.

For seeds, in all their multifaceted glory, are the future of plants.

All genetic information for future generations of plants is retained in seeds.

This is the building. It actually looks pretty modest.

But it has a lot of stories underground.

And it is the largest seed bank in the world.

It is distributed all over the world, not just in the south of England. That's it.

This is a nuclear-proof facility.

God forbid you have to endure it.

So when building a seed bank, you have to decide what to store there. right?

And we decided that it was the most threatened species that we wanted to save first.

And they are dry land seeds.

So, first of all, we did business with 50 countries.

That means negotiating with 50 heads of state and secretaries of state to sign the treaty.

We have 120 partner institutions around the world, all orange.

People come from all over the world to learn, then leave and plan exactly how to collect these seeds.

Thousands of people around the world have tagged where those plants are supposed to be.

they look for them. They find them in flowers.

And when the seeds arrive they will return.

And they collect seeds. In the world.

Seeds -- Some are very non-technical.

Put them all in a bag and let them dry.

you label them. Here and there we do high-tech things, and here and there we do low-tech things.

And most importantly, it should be dried very carefully at low temperatures.

And it has to be stored at -20 degrees Celsius (I think about -4 degrees Fahrenheit) with a very low moisture content.

And we believe that these seeds, like many seeds, can take thousands, and certainly hundreds of years to germinate.

There is no point in storing seeds if you are not sure if they are still viable.

That's why every 10 years we run a germination test on every sample of seed we own.

And this is a decentralized network.

People all over the world are doing the same thing.

and thereby enable the development of germination protocols.

That means we know the right mix of heat and cold and the cycles required to germinate seeds.

And it's very useful information.

And we grow these things, and we say to people in the countries where these seeds come from, "Look, actually, we're not just storing this to get the seeds later, but we can give you information on how to germinate these difficult plants."

And it's already happening.

So where do we need to go?

We are pleased to announce that our 3 billionth seed - the 3 billionth seed - is now in storage.

10 percent of all plant species on earth, or 24,000 species, are safe. 30,000 species by next year if funding is available.

25% of the world's plants by 2020.

These aren't just crops like the ones you've seen stored in Norway's Svalbard archipelago. There are some great works on display there.

This is at least 100 times bigger.

We have thousands of collections shipped worldwide. Drought-tolerant forest species were sent to Pakistan and Egypt. Plants with particularly high photosynthetic efficiency come here to the United States. Salt-tolerant forage varieties are sent to Australia. The list goes on and on.

These seeds are used for repair.

Therefore, already damaged habitats, such as tall grasslands here in the United States and mine sites in various countries, are already being restored thanks to these species and thanks to this collection.

Some of these plants have the last few plants left, like the one on the bottom left of the screen.

A man was there collecting seeds in a truck, and the last remaining trees were reduced to about 30 trees.

It is a very useful plant both as a protein and as a medicine.

We train in China, USA and many other countries.

how much does it cost?

$2,800 per species averages.

We think that it is cheap when we think about price.

And then you get all the scientific data that goes with it.

Future research will ask, "How can we find genetic and molecular markers of seed viability without planting seeds every decade?"

And it's almost there.

thank you very much.

(applause)

I was thinking about my place in the universe and the first time I thought about what infinity meant when I was a kid.

And I wondered if if time could go infinitely forwards and backwards, that might mean that every point in time is actually infinitely small and therefore somewhat meaningless.

So, as far as time goes, we have no real place in space.

But nothing else.

Therefore, every moment, this moment included, is the most important moment that ever happened.

So the music you're about to hear is probably the most important music you'll ever hear in your life.

(Laughter) (Applause) (Applause) Thank you.

(Applause) (Applause) For those of you who are lucky enough to meet me in the future, please stop saying, "Oh my god, you're actually shorter."

(laughs) For some reason the stage is like an optical illusion.

(Laughter) It's kind of like the curves of the universe.

I don't know what it is. People often ask me in interviews, "Oh my God, your guitar is so huge!"

(Laughter) "It needs to be custom-made. It's a special, giant guitar."

(Laughter) (Applause) Thank you.

(applause)

How can a breathalyser test measure the alcohol content in a person's blood hours after the last drink based on breath alone?

Exhaled breath contains trace amounts of hundreds, even thousands of volatile organic compounds. Volatile organic compounds are small molecules that are light enough to move easily as gases.

One of them is ethanol, which is found in alcoholic beverages.

It travels through the bloodstream to the small air sacs of the lungs, where it is exhaled at concentrations that are on average 2,000 times lower than in the blood.

When someone blows into the breathalyzer, ethanol from their breath enters the reaction chamber.

There it is transformed into another molecule called acetic acid in a special type of reactor that generates an electric current during the reaction.

The strength of the current indicates the amount of ethanol in the air sample and thus blood.

In addition to the volatile organic compounds like ethanol that we consume in our food and drink, many other compounds are produced in the biochemical processes of our cells.

And when something interferes with these processes, such as disease, the collection of volatile organic compounds in exhaled breath can also change.

So, without using more invasive diagnostic tools such as biopsies, blood draws or radiation, can we detect disease by analyzing human breath?

In theory yes, but testing for disease is much more complicated than testing for alcohol.

To identify a disease, researchers need to look at sets of dozens of compounds in breath.

Certain diseases may increase or decrease the concentration of some of these compounds, while others may remain unchanged. Profiles are likely to vary from disease to disease and may even change in different stages of the same disease.

For example, cancer is one of the most studied candidates for breath analysis diagnosis.

One of the biochemical changes that many tumors cause is a massive increase in an energy-producing process called glycolysis.

This increase in glycolysis, known as the Warburg effect, can result in an increase in metabolites such as lactate, which in turn affects the entire cascade of metabolic processes, ultimately leading to changes in breath composition, possibly including increased concentrations of volatile compounds such as dimethyl sulfide.

However, the Warburg effect is only one possible indicator of cancer activity and reveals nothing about specific types of cancer.

More indicators are needed to make a diagnosis.

To find these subtle differences, researchers use profiles based on hundreds of breath samples to compare the breath of healthy people with those suffering from certain diseases.

This complex analysis requires a more versatile type of sensor that is fundamentally different than breathalyzers.

Some are in development.

Others identify individual compounds by observing how they move through a series of electric fields.

Others use a series of resistors made of different materials, each of which changes resistance when exposed to a specific mixture of volatile organic compounds.

There are other challenges as well.

These substances are present in incredibly low concentrations, typically only parts per billion, far below the concentration of ethanol in breath.

Compound levels can be influenced by factors other than disease, such as age, gender, nutrition, and lifestyle.

Finally, there is the problem of distinguishing which compounds in the sample are produced by the patient and which are inhaled from the environment just prior to testing.

Due to these challenges, breath analysis is not yet fully ready.

However, preliminary clinical trials in lung, colon and other cancers have shown promising results.

One day, detecting cancer early may be as easy as taking a breath in and out.

When it comes to harnessing the creative imagination, the first thing that comes to mind is not the president of the university.

So I thought I'd start with how I got here.

The story begins in the late 90's.

I have been invited to meet with leading educators in newly liberalized Eastern Europe and Russia.

They were looking for ways to rebuild the university.

They recognized that education under the Soviet Union was essentially propaganda that served national ideological ends, and that a sweeping change was needed to provide a proper education for free men and women.

Given this rare opportunity to make a fresh start, they chose the liberal arts as their most compelling model because of its historic commitment to furthering the broadest intellectual and deepest ethical potential of its students.

Having made that decision, they came to the United States, the home of liberal arts education, and spoke with some of us who were closest to that kind of education.

They spoke with passion and urgency, with intellectual conviction, but for me it was a voice I hadn't heard in decades, a dream long forgotten.

Because, in truth, we were light years away from the passion that drove them.

But for me, unlike them, in my world the lithographs were not pretty, and what was written there was not encouraging.

In fact, there is no longer a liberal arts education, or at least a real liberal arts education, in this country.

We have specialized the liberal arts and failed to provide the broad range of applications and enhanced capacity for civic participation that characterize it.

Over the past century, experts have replaced educated generalists as the sole model of intellectual achievement. (Applause.) Expertise certainly had its moments.

But the price of that dominance is enormous.

The subject is broken down into smaller and smaller pieces, with more emphasis on the technical or obscure.

We have even been able to esoteric the study of literature.

You might think you know what goes on in a Jane Austen novel—until your first encounter with postmodern deconstructivism.

The progress of today's college students is to abandon all interests except one.

And in doing so, we continually narrow our focus and learn more about less. This despite the evidence all around us pointing to the interconnectedness of things.

Lest we be exaggerating, this is where the A-B-C of anthropology begins.

The higher you climb the ladder, the more doubts you have about values ​​other than technical competence.

"What kind of world are we creating?"

What kind of world should we create?

What kind of world can we create? ”

They are treated with increasing skepticism and leave the table.

In doing so, the defenders of secular democracy have effectively surrendered the nexus between education and values ​​to the fundamentalists, who certainly have no qualms about using education to enhance the absoluteness of their values, theocracy.

Meanwhile, democratic values ​​and voices are silent.

Either we have lost touch with those values, or even more, we believe they do not need or cannot be taught.

This aversion to social values ​​may seem at odds with the explosion of community service programs.

But despite all the attention on these initiatives, it's still important that they're extracurricular activities.

In effect, civic thinking is treated as outside the realm of serious thinking and purported adult purposes.

Simply put, when there is an urge to change the world, academies are more likely to produce a sense of learned helplessness than a feeling of empowerment.

This brewing—the oversimplification of civic participation, the idealization of professionals, the fragmentation of knowledge, the emphasis on technical proficiency, and neutrality as a condition of academic honesty—is toxic when it comes to pursuing the crucial links between education and the public good, between intellectual honesty and human freedom. They were central to the challenges posed to and by my European colleagues -- (applause) --.

Let me pause for a moment to say that when the astronomical distance between the reality of the academy and the prescient intensity of this challenge was more than enough, what was happening outside higher education was an unthinkable step back.

Whether it was threats to the environment, inequality in the distribution of wealth, or the lack of sound and sustainable policies for sustainable energy use, we were in a desperate predicament.

And that was just the beginning.

The corruption of our political life has become a living nightmare. Nothing was exempted from separation of powers, civil liberties, the rule of law, the relationship between church and state.

It was accompanied by a waste of the material wealth of a country that ignored credulity.

A disastrous bias against the use of force became common, as did an aversion to alternative forms of influence.

At the same time, all our firepower was powerless to stop or stop the genocide in Rwanda, Darfur and Myanmar.

Our public education, once the model of the world, has become the center of attention for its failures.

Too many students lack basic skills and minimal cultural literacy.

Despite having the world's enviable research facilities, more than half of Americans don't believe in evolution.

And don't push luck on how well those who believe it actually understand it.

Incredibly, the country, despite having all the material, intellectual and spiritual resources, seems utterly powerless to reverse free fall in any of these areas.

Equally astonishing, from my point of view, is the fact that no one has been able to draw any connection between what is happening in political institutions and what is happening in our major educational institutions.

We may top the list when it comes to influencing individual access to wealth.

We are not even on the list when it comes to our responsibility to the health of this democracy.

we are playing with fire

Jefferson undoubtedly understood what he meant when he said, "If the nation expects itself to be ignorant and free in the state of civilization, it expects what it never has, and never will."

(Applause.) On a more personal note, this betrayal of our principles, our decency, and our hopes has made me, as the president of a prestigious liberal arts college with a renown history of innovation, compelled me to ask myself, "Years from now, when people ask, 'Where have you been?' what will you say?"

So in Bennington the conversation started.

We know that if we are to restore the integrity of liberal education, we need to fundamentally rethink our basic assumptions, starting with our priorities.

The main purpose is to enhance the public interest.

To achieve civic virtue, it is important to use your intellect and imagination in the most difficult situations.

Our approach to agency and authority is flipped inside out to reflect the reality that no one has the answers to the challenges facing our nations in this century, and that everyone strives to find them and has a responsibility to participate.

Bennington continues to teach art and science as areas of immersion that recognize the difference between personal and professional goals.

But the balance is redressed and our common purpose takes on equal, if not more, importance.

When the design came out it was surprisingly simple and easy.

The idea is to make political and social issues themselves the organizers of the curriculum, from health and education to the use of force.

They will assume commanding roles in traditional fields.

But the structure is designed to connect rather than isolate triangles, rather than divide interdependent circles.

And importantly, treat these topics as frameworks for action rather than as topics of research.

The challenge is to understand what it takes to actually do something that will bring about significant and sustainable change.

Contrary to widely accepted assumptions, the emphasis on action brings a special urgency to thinking.

The importance of understanding values ​​such as justice, fairness, and truth becomes increasingly apparent as students realize that when the issue is rethinking strategies for education, approaches to health, or achieving equity economics, interest alone cannot convey what they need to know.

Past values ​​are also revived. It offers a lot of companionship.

Just as you're unlikely to be the last, you're also not the first to try to figure this out.

Even more valuable, history provides a laboratory to see not only the intended outcome of an idea, but actually unfold.

In the words of my students, "It is important to think deeply when considering what to do about important things."

A new liberal arts is emerging to underpin this action-oriented curriculum.

Rhetoric, the art of organizing the world of words for maximum effect.

Design, the art of organizing the world of things.

Mediation and improvisation also occupy a special place in this new temple.

Quantitative reasoning is right at the heart of what measurement needs to do to manage significant change.

So is the ability to systematically discern what is in the center and what is on the periphery.

And where making connections is vital, the power of technology manifests with special intensity.

But so is the importance of content.

The stronger our reach, the more important the “what about?” question.

When improvisation, wit and imagination are key, when action strategies are in the process of being designed, the artist finally gets to the table.

In the dramatically expanding ideal of a liberal arts education, in which continuation of thought and action is the blood of life, knowledge cultivated outside the school is essential.

Social activists, business leaders, lawyers, politicians, and professionals join the faculty as active and ongoing participants in this wedding between liberal education and advancing the public good.

Students are then continually stepping outside the classroom and engaging directly with the world.

And of course, this new wine needs a new bottle to express the vibrancy and dynamism of this idea.

Our most important finding in our focus on public action is the realization that the hard choices are not between good and evil, but between competing commodities.

This discovery is transformative.

It undermines self-righteousness, radically alters the tone and character of the argument, and dramatically enriches the potential for finding common ground.

Ideologies, fanaticism and unfounded opinions are of no use.

Indeed, this is political education.

But it is principled politics, not partisan politics.

So the challenge for Bennington is to do just that.

The cover of Bennington's 2008 holiday card features an architect's sketch of a building that will open in 2010 as a center of public action.

This center will embody and sustain this new educational commitment.

Think of it as a kind of secular church.

The words on the card describe what happens inside.

We will channel the intelligence, imagination, passion, and audacity of our students, faculty and staff into developing strategies to tackle the critical challenges of our time.

So we are doing our job.

The past few weeks have been a period of national upsurge in the country, but if you think your job is done, it would be a tragedy.

The icy silence we have experienced in the face of the shattering of constitutions, the dismantling of public institutions, and the aging of infrastructure is not confined to universities.

We, the people, have grown accustomed to our own worthlessness when it comes to doing something more important than waiting four more years on important matters of governance.

We also continue to be sidetracked by the idea that only experts can come up with answers, despite overwhelming evidence to the contrary.

The problem is that there is no viable democracy of experts, fanatics, politicians and bystanders.

(Applause.) People will and should continue to learn everything there is to know about anything.

In fact we do it all the time.

And some people will, and should, spend their entire lives pursuing very well-defined areas of inquiry.

But this single-mindedness does not create the flexibility of mind, the diversity of perspectives, the capacity for cooperation and innovation that this country needs.

It will appear there.

What is certain is that the individual talents so abundantly on display here need attention in the collaborative, thorny, frustrating, contentious and impossible world of politics and public policy.

President Obama and his team cannot do it alone.

If the question of where to start seems overwhelming, you are at the beginning of this adventure, not the end.

Overwhelming is the first step if you are serious about something that really matters and on a scale that makes a difference.

So what do you do when you feel overwhelmed?

Now you have two things.

you have a heart And you have others.

Start with them and change the world.

(applause)

After centuries of war, the kingdoms of the world have reached an agreement.

Every five years, teams representing elves, goblins, and treefolk compete in epic tournaments of Dragon Jousts.

Each team will play each other once.

The Kingdom of the team that wins the most matches will rule the entire Center Realm until the next tournament.

To prevent outside interference, the game is played in absolute secrecy, with the exception of a group of wizards who ensure that no one uses enchantments, spells, and spells to cheat.

You have been given the very important task of recording the scores for the first tournament.

But the opening celebration gets a little out of control, and you wake up to find that the match has already started.

Luckily, no one has noticed your absence so far.

However, you should quickly get used to the situation. It would drive you crazy if your boss, the head of tournament officials, found out that you were falling asleep at work.

After considering your options, you decide to offer your life savings to one of the regulators in exchange for information and give them a blank scorecard to complete.

But before he could finish speaking, he entered the tent.

Having barely managed to hide the scorecard in time, the Wizard excuses himself.

your boss laughs

"I hope you don't believe anything Gorbak says, but he is cursed to only lie, even in writing.

Can you believe the tournament scored this low anyway?

Every team has played at least once, but no game has a total score of more than 5 hits.

Anyway, I'll be right back and check the scorecard. ’ You laugh together, and after he leaves, you look at the partially completed card and find out that all the numbers on it are wrong.

You only have one chance to save yourself. So what is the actual score for each match?

Stop now and figure it out for yourself.

The amazing thing about this mystery is that despite the almost complete lack of correct information, a solution can be reached.

And it is possible because knowing that something is false is itself meaningful information.

The first key is to realize that no team will play more than 2 games as there are only 2 other teams.

So if the elves actually played 1 game and the goblins didn't actually play 2 games, then the truth must be that the elves played 2 games and the goblins 1 game.

Since the elves played two games, they should have played each other team once.

And since the goblins have only played one match against the elves so far, it means that the match between goblins and treefolk has yet to take place.

We know that Treefolk are wrong about having zero draws in their games. In other words, the match with the elves should have been a draw.

We also know that the elves must have beaten the goblins because they won at least one match and tied with the treefolk.

But is it possible to know the actual score?

Let's start with the relationship between elves and treefolk.

The final score must have been 0-0, 1-1, or 2-2, as there were no more than 5 total hits recorded.

But it would be wrong to say that the Treefolk should have had several hits and only had one against them.

Only 2-2 options left.

In a match between an elf and a goblin, the goblin should have scored at least one shot.

And the elf's score must be 2 or higher for them to win the match.

This leaves a small chance that the total will be 5 or less.

These 2 points are gone because the Elves couldn't score 3 points.

And this game is also out because the total of hits scored in both games does not reach 6.

So the score should have been 2-1.

With one game to go, you've saved your job and your neck.

The wizard Gorbak may have lied, but your reasoning skills quickly tied the score.

Walk around for 4 months with 3 wishes and all the ideas will start to seep in.

I think everyone should. Imagine you have three wishes.

And what would you do? This is actually a great exercise to delve into what you feel is important and to think deeply about the world around us.

And can an individual actually do something or come up with something that actually grabs attention and makes a difference?

Inspired by nature, that's the theme here.

Frankly, I think that was where I started.

As a Canadian, I became very interested in this landscape.

We have this Great North. The population was fairly small and my father was an avid outdoor enthusiast.

So I had the chance to experience it for myself.

And I couldn't figure out exactly what it was or how it was giving me information.

But what it was telling me was that we were a temporary event happening now, and the nature you see there, the pristine coastlines and the pristine forests that I could see, really gave a sense of a geological epoch, that this has been going on for a long time, and that we are experiencing it in a different way.

And that, for me, was the reference point that I thought was necessary to do the work that I did.

Then I actually went outside and took pictures of the grass growing on the roadside in spring.

The revival of this grass. For many years after that I went out to photograph the original landscape.

However, as a fine art photographer, I somehow felt that this was not going to catch on, and that trying to build this as a fine art career would be problematic.

And I kept getting drawn into calendar paintings and that kind of genre, and I couldn't get out of it.

So I started thinking about how we could rethink the landscape.

I decided to rethink landscapes as landscapes that we have changed.

I got lost in Pennsylvania and had a little epiphany and turned left to get back on the highway.

And I ended up in a town called Frackville.

When I got out of the car and stood up, it was a coal mining town. I did a 360 degree rotation and it turned out to be one of the most surreal landscapes I've ever seen.

Completely changed by humans.

So I got to go out and observe mines like this, and the largest industrial encroachments in any landscape I could find.

And that became the baseline for what I do.

And it was also a theme that I felt I could carry on without having to reinvent myself. This subject is big enough to be my life's work, something I can take seriously and research and find out where these industries are.

And I think one of the things I wanted to say thank you was to thank all the companies that helped me get on board. I missed it a bit.

Because it took negotiations to make almost all of these pictures. I would never have made this series if it hadn't been for the people who put me at the top of those companies to go into the place to take the pictures.

So I'm not against companies in that regard.

I own a legal entity. I work with them and I feel like we all need them and they are important.

But I'm also for sustainability.

So there are things that are pulling me in both directions.

I don't mean to blame what's going on here, but things are moving slowly.

So I began to wonder if we are living in any age of humanity, the Stone Age, the Iron Age, the Copper Age.

And humans of these ages are still working today.

But we are completely cut off from them.

There is something there that we don't see.

And it's also scary. Because when we start looking at our collective desires for our lifestyles and what we do with that landscape, that's a very sobering moment for me to ponder.

And through my photography, I hope to captivate the viewers of my work and get close to it without being immediately rejected by images.

Instead of saying, "Oh my God, what is that?" But to be challenged – on one level you say 'Wow, this is beautiful' and on another level you say 'This is scary, you shouldn't enjoy it'.

Like forbidden pleasure. And I think that forbidden pleasure is what resonates with the world, attracts people's attention, and makes people enter the world. And it kind of defines what I want to do with my life.

I want a house, I want a car.

But there are consequences like this.

And how can we start having that attraction or repulsion?

I believe so in my own conscience, and I am trying to build the same switch here in my work.

The one I took a picture of, the pile of tires here had 45 million tires. That was the biggest.

It's only about an hour and a half away from me and had a fire about four years ago. Westley, California, around Modesto.

And I decided that if, for me, my early work looking at landscapes meant lamenting what we were doing to nature, then in the recycling work you see here, I would start looking at what was beginning to point. For me it was our salvation.

That said, in the recycling work I was doing, I was looking for sustainable human activity practices.

If we keep putting things back into the system through the existence of industry and cities, if we keep doing that, we can keep going.

Of course, listening at conferences, there's going to be a lot going on. Biomimicry, and many other things are coming up. Nanotechnology may save us from having to go into that landscape and tear it apart.

It's also a day that everyone is looking forward to, as they passionately talk about it (also quoted here).

But in the meantime, these things are scaling up.

These things are still going on.

What you're seeing here -- I went to Bangladesh and started to leave North America. I have come to see our world globally.

These Bangladeshi images came from a radio program I was listening to.

They talked about Exxon Valdez and how the insurance industry would cause an oversupply of oil tankers.

And those oil tankers had to be retired, and 2004 would be the pinnacle of that.

And I thought, "Oh my God, could it be something?"

Watching the largest human vessel literally dismantled by hand in third world countries.

So, I originally intended to go to India.

And I was locked out of India because of the Greenpeace situation in India, but then I was able to get into Bangladesh and see for the first time that view of the third world that I really didn't think was possible.

With 130 million people living in an area the size of Wisconsin, with people living everywhere, the pollution was terrible and the working conditions were terrible.

Here we look at some of the largest oil fields in California. Then again, I had another epiphany and began to attribute the entire world I live in to the abundance of oil.

And that was for me again what I started building and continued to build.

So this is a series titled "Oil Party" that I hope to have ready in the next couple of years.

Because I think that clothes, cars, roads, everything that we are involved with is a direct result.

Let's move on to Chinese photography.

And for me, China is something I started photographing four years ago, and in my mind China is really a sustainability issue, not to mention the huge impact it has on the industries I grew up in.

I come from a blue-collar town, a GM town, and my dad worked for GM, so I'm very familiar with that kind of industry, and that's influenced my work. But as you know, it's quite a sight to see China and the scale of its development.

Here you can see the Three Gorges Dam, which is 50% the largest dam ever attempted by mankind.

Most of the engineers in the world left the project because it was "too big".

In fact, when it was actually filled with water a year and a half ago, we were able to measure the wobble in the Earth as it rotates.

It took 15 days to fill it.

This created a 600-kilometer-long reservoir, one of the largest reservoirs ever created.

And one of the larger projects associated with this was to move 13 full-scale cities outside the reservoir and level all the buildings so that ships could navigate.

This is "before and after". It used to be.

And this one was dismantled by hand after 10 weeks.

I believe dynamite was used in 11 of the buildings, but everything else was done by hand. That was 10 weeks later.

And this gives you an idea.

And it was all people living in those houses, actually working tearing down the houses and getting paid by the brick to tear down the city.

And these are some of the images in it.

So I visited the Three Gorges Dam three times and witnessed a dramatic change in the landscape.

It looks like a bombed-out landscape, but it's not.

What it is, it's a deliberate landscape.

This is the need for power and they are willing to go through this massive transformation on a scale to get that power.

And again, it's also a relief to what's actually happening in China. Because I believe there are 27 nuclear power plants currently under construction.

Not made in North America for 20 years due to the "NIMBY" issue, or "Not In My BackYard".

But in China, they say, "No, we're going to have 27 people in the next 10 years."

And literally every week, coal-burning furnaces are installed there for hydroelectric power generation.

So coal itself is probably one of the biggest problems.

Another thing that happened in the Three Gorges was that much of the farmland seen on the left was also lost. Some of its most fertile agricultural land has been lost.

And between 1.2 million and 2 million people relocated, depending on whose stats you're looking at.

And this is what they were building.

This is Wushan, one of the largest cities we have moved to.

This is the city hall of the city.

And also the rebuilding of the city, but for me it was disappointing to see, perhaps from an urban planning point of view, that much of what we know here is not really understood by them.

There were no parks. There was no green space.

Lives in very high density on hillsides.

And here they had the opportunity to rebuild the city from the ground up, but somehow not connected with them.

The sign here translates to 'observe contraception.

Build a scientific, civilized and advanced way of thinking about marriage and procreation. ”

If you look at this poster, you'll see all the elements of Western culture.

You can see the tuxedo and the bouquet.

But what really scares me about this photo and this billboard is the refinery in the background.

So it's kind of an amalgamation of everything we have, a perfect adaptation of our way of life.

And also, when you start seeing that kind of embrace, when you see them living a rural lifestyle in a very small area and moving to an urban lifestyle in a much larger area, it starts to get very chilling.

This was taken in one of the largest squares in Guangdong Province, where many migrant workers come from Guangdong.

Approximately 130 million people are constantly migrating to urban centers, and it is expected that another 400 to 500 million people will migrate to urban centers such as Shanghai and manufacturing centers in the next 10 to 15 years.

Manufacturers are usually domestic manufacturers. You can tell by the fact that domestic factories all use uniforms of the same color.

So this is the factory's pink uniform. A shoe factory.

There is also a dormitory for employees.

So they bring them in from the country and put them in a dormitory.

This is Yuyuan Shoe Factory, one of the largest shoe factories near Shenzhen. 90,000 employees manufacture shoes.

This is one of three shifts.

There are two factories of this size in the same town.

There are 45,000 people here, so about 12,000 come to lunch every lunch.

they sit They have about 20 minutes.

The next round begins. An incredible workforce is built there. Shanghai -- I'm looking at urban renewal in Shanghai, and the whole area will be flattened and converted to skyscrapers in the next five years.

What's happening in Shanghai is that China is changing because five years ago, for example, this didn't happen. This is a holdout.

They are called Denzafu and are like pins stuck in the ground.

they don't move. they are not negotiating.

It doesn't work because it doesn't get enough.

So they are holding off until an agreement is reached.

And since most of them get raw deals, they're actually pretty successful at getting better deals.

They are published in about two hours. Communities that have existed for literally hundreds, or perhaps thousands of years, are being dismantled and sprawling out into suburban areas outside Shanghai. But these are a bunch of guys who are working hard to rebuild Shanghai.

It is probably the largest urban renewal project ever attempted on the planet.

And accepting what they were trying to replace it with, which was also one of my wishes, never ended up going there, but somehow telling them there was a better way to build a house.

There are quite a few things like clash of styles and things, and these are called villas.

And, as it is now, they're just on the move.

The scaffolding is still there, this is the e-waste area, and if you look in front of the big print, you'll see that this industry, that industry, recycles everything.

The industry is therefore already growing around these new developments.

This is a five-story bridge in Shanghai.

Shanghai was a very interesting city. The city is developing explosively at a level never before experienced.

In fact, even Shenzhen, one of the first economies, had a population of about 100,000 15 years ago, and now boasts about 10-11 million.

Now you know the type of migration and its speed. This is just a cab manufactured by Volkswagen.

There are 9,000 units here and they are being built for most of the big cities like Beijing, Shanghai and Shenzhen.

And this is not even the domestic car market. This is the taxi market.

And what we see here as suburban developments are all skyscrapers, albeit similar.

So they build 20 or 40 at a time, and they're built just the way single-family homes here in the area are built.

And the density is pretty amazing.

And one thing I want to point out in this photo is that when I saw this kind of building, I was shocked to see that no centralized air conditioning system was used. All windows are air conditioned.

I'm sure there are people here who probably know more about efficiency than I do, but I can't imagine every apartment having its own air conditioner, which is a very efficient way to cool a building of this size.

And when you look at it and start calculating a city as big as Shanghai, it becomes literally forested with skyscrapers.

The speed of change in this city is breathtaking.

And, you can see it in the foreground of this photo, this is one of the last areas that was still blocked.

Now it's all been demolished, which was completed about 8 months ago, and now there's a skyscraper in the middle of it.

In other words, skyscrapers will be built in Shanghai literally overnight.

Just recently, I entered China and started looking into some of China's biggest industries.

And here is Baosteel in the suburbs of Shanghai.

This is the coal supply to the steel plant - 18 square kilometers.

This is an incredibly large operation, with 15,000 workers, 5 cupolas, and a sixth cupola, I believe, here.

So they are building a very large blast furnace to meet China's steel demand.

This is one of the three blast furnaces shown in that shot.

And again, when I look at these images, I always see something like fog.

This will show you the assembler in real time. It's a circuit breaker.

10 hours a day at this rate.

I think one of the problems we have here with China is that they use a lot of the latest production technology.

There were 400 people working at the site.

And I asked my manager to name the 5 fastest producers. Then I spent about 15 or 20 minutes looking at each one and chose this one.

And it was just lightning fast. Her performance was almost incredible.

But that's the trick they have now, and the secret they're winning is that they're using all the latest technology and extruders, they're running all the components, but what they're really putting in is the assembly part, and the country workers are working very hard. they want to work

There are still a large number of people who want jobs.

If they get what they want, this will continue for the next 10-15 years. That means another 400-500 million people will flow into cities.

In this particular case, this is the assembly line you saw. This is that shot.

I had to use a very small aperture to get depth of field.

I had to hold still for 10 seconds to get this shot.

It took about 5 fake tries because they were just going. It was literally impossible to slow them down.

They ended up doing this all day long until the manager was forced to say in a stern voice, "Okay, we're all frozen."

It wasn't that bad, but they're being driven to produce these things at an incredible rate.

This is a textile factory that produces synthetic silk, a petroleum by-product.

What we're looking at here is another one of the most advanced textile mills.

There are 500 of these machines. Each worth about $200,000.

So about a dozen people are running this and they're just inspecting and just walking the line.

The machines are all up and running, which is incredible given the scale of the industry.

And I went further and further into the factory.

And it is a diptych. I do a lot of pairings to get a feel for the scale of these places.

This is the line where yarn is obtained and wound before entering the textile factory.

Here, it is the manufacture of shoes that is much more labor intensive.

About 1,500 employees work on this floor.

The company itself has about 10,000 employees and makes shoes made in Japan.

It was very difficult to get into an international company as I had to obtain permits from companies such as Nike and Adidas.

And they don't want me in.

But domestic was much easier.

It just makes me feel, once again, that from there the whole work movement flowed to China and started making shoes. Nike was one of those early companies.

It had such a high labor factor that it made a lot of sense to pursue that labor market.

This is a high tech mobile phone. Bird mobile phone, one of the largest mobile phone manufacturers in China.

Mobile operators are popping up literally every week and I think mobile phones are growing exponentially.

This is a textile product from which Youngor, China's largest shirt factory and clothing factory, produces shirts.

The next shot is one of the lunchrooms.

Everything is very efficient.

On average, people have lunch for 8-10 minutes while preparing this shot.

This was one of the largest factories I have ever seen.

They make coffee makers here, they are the biggest coffee makers and the biggest iron makers, they make 20 million coffee makers in the world.

The number of employees is 21,000. This one factory, which had several factories, is half a kilometer long.

These were taken recently. I just got back a month or so ago, so you'll be the first to see these new factory photos I took.

So it took me almost a year to be able to access these places.

Another aspect of what is happening in China is that China really needs the supplies.

Therefore, much of the recycled material collected here is recycled and shipped to China.

It's a cube of metal. This is an armature, an electric armature, which recycles the copper and high-grade steel extracted from the electric motor.

This certainly has to do with California and Silicon Valley.

But this is what happens on most computers.

50% of the world's computers are eventually recycled in China.

There it is called "e-waste".

And that's a bit of a problem. The way they recycle the board is actually with briquettes, which is used all over China, but they heat the board and use pliers to remove all the components.

They are trying to extract all the precious metals from these parts.

However, its toxic odor can actually be felt 5 to 10 kilometers away when you enter a town where this kind of plank burning is practiced.

Another operation is described here. It's all cottage industry, so it's not a big place. We burn boards all over people's porches, backyards, and even homes if they're worried about someone coming. Because in China it's considered illegal, so we're doing it, but we can't stop the product from flowing in.

This Portrait -- I'm not usually known for portraiture, but I couldn't resist this one. She went through Mao Zedong, through the Great Leap Forward and the Cultural Revolution, and now sits on the verandah with this e-waste by her side. It's a good deal.

This is one of the largest recycling towns, with roads reinforced with computer boards.

So, these are the pictures I wanted to show you.

(Applause.) I would like to dedicate my prayers to my two daughters.

They sat on my shoulder the whole time I was thinking.

One is Megan, the one on the right, and Katya there.

And for me, this whole concept, what I'm photographing, comes from a great concern about the scale of our progress, and what we call progress.

And of all the things that are about to break that can solve so many problems, there are great things just around the corner, and as much as they are evident in this room, I really hope that they spread out into the world and begin to have an impact for good.

And it's not just impacting our world, it's starting to increase -- because we think we can start fixing our footprint and bring it down -- but there's an increase in footprint that's happening in Asia, and it's growing at a rapid, rapid rate, so I don't think it can be evened out. So I think the final strategy is that we have to be very concerned with their evolution. Because it is also related to our evolution.

Part of my thoughts, and part of my desire, is to sit with those thoughts in mind and think, 'What will their lives look like 20 years from now, or when they're ready to get married, or 15 years from now?

And for me, it's the core behind most of my thinking, both in my work and in the wonderful opportunities to make wishes come true.

One of my wishes is to change the world. I hope to use my images to persuade millions of people to join the global conversation on sustainability.

And through today's communication, I believe it's not an unrealistic idea.

Oh, so I went looking - I wanted to connect what I had in my head with something. I didn't want a wish that started from scratch.

One of them started with almost nothing, and the other wanted to know what was going on and working.

And Worldchanging.com is a great blog that currently has close to 500,000 visitors per month.

And it started just 14 months ago.

The great thing about what's going on there is that the tone of the conversation is my favorite tone.

So what they are doing is that it really isn't. I think the environmental movement has failed in using too many sticks. The apocalyptic tone is overused. It doesn't sell the positive aspects of caring for the environment and trying to set us apart.

The conversations taking place on this blog are about positive movements and how to quickly change our world for the better.

And it looks at technology, it looks at new energy-saving devices, and how it rethinks and re-strategizes the movement towards sustainability.

So for me, part of my work was to help promote the Worldchanging.com website.

As some of you may know, he's a TEDster -- Stephen Sagmeister and I are working on some layouts. And this is still in the preliminary stages. These are not finals. But with Worldchanging.com you can put these images in any kind of media.

They may be posted through the web. It can be used for billboards, bus stops, or similar applications.

So we see this as what we're trying to build.

And what we ended up arguing was that most media is mostly images with a lot of text, and that text is all over the place.

What's unusual, according to Steven, is that less than 5% of ads are actually led by images.

And in this case, it's all about these many images and what they represent and the kinds of questions they raise, so I thought I'd play the images and have someone say, "So what does Worldchanging.com need to do with these images?"

And hopefully it will inspire people to visit the website.

I started Worldchanging.com and am building a blog for it. It's a blog and I hope it's not, but I don't consider this the kind of blog where we'll all be following each other to death.

This is the person who speaks up, goes out and starts reaching out. Because now discussions are taking place in India, China and South America, and entries are coming in from all over the world.

I think there's an opportunity to have a conversation about sustainability at Worldchanging.com.

And anything you can do to facilitate that is great.

I wish what I was trying to do was more bottom-up and ground-up.

And this is to launch a ground-breaking contest that motivates kids to invest and invent ideas about sustainability.

And one of the things that became clear was that Alison, who actually nominated me, said something earlier in the brainstorm. She said recycling in Canada had a wonderful impact on our psyche through children in grades 4 to 6.

Think about it, 4th graders, my wife and I say 7 is the age of reason. That is, they enter the age of reason. And they are prepubescent.

So it's this wonderful window that they really are, and you can influence them. Do you know what happens during puberty?

We know that from previous presentations.

So my idea here is to try and motivate the kids to take the ideas home. Help them understand what sustainability is and that they have a vested interest in making it happen.

So, one of the ways I've thought about it is to use my winnings, I'll take $30,000 or $40,000 of my winnings, and the rest will be managing this project, but I'm going to use it as a prize to reach out to the kids.

But another thing I thought would be great is creating these. This is called a "prize target".

So, you might think of the best sustainable ideas for school projects, the best ideas for home projects, or the best ideas for community projects with sustainability in mind.

I also thought that the best "In My World" should be given a nice prize. And what happens, it's an extensible thing. And if you can get people to fund it, whether it's facilities like a media lab, or money to make the prize fully meaningful, and open it up to every school that's a public school, or any school with kids that age, and make it a broader competition that people can enter for the prize.

And the award must be verifiable, so it's not just an idea.

A work of art is about an idea and how it is expressed and executed, but what is real must be verifiable.

This is how we motivate certain age groups to start thinking.

And I believe they are trying to push it up from the bottom up, into the home. And parents will respond and try to help out with the project.

And I think that starts to motivate and teach them the whole idea towards sustainability in a very positive way. They know about recycling, but I don't think they understand sustainability and energy usage in everything and how important it is.

And for me it is a great desire to teach them, and definitely something I will stand for.

And also, "In My World" will use the artwork from the competition in the competition for promotion.

And I like the phrase "in my world". Because it makes the person doing it own the world.

It's my world. not someone else's. I would love to help with that. I want to do something with it. So I think this school has a great opportunity for imagination and great ideas come from the children. Then you can put that imagination into your projects and do something for your school.

I think all schools could use extra equipment and extra funding. It will be an incentive for schools.

These are some of the ideas you might use to promote "In My World".

And my third wish is an Imax film. So I was told, 'Try it yourself,' and I've always wanted to actually do something.

And the scale of my work, and the kinds of ideas I'm working on -- when I first saw the Imax movie, I immediately thought: "There's a real resonance between what I'm trying to do and the scale of what I'm trying to do as a photographer."

And I think it really has the potential to reach new audiences, given the chance.

So I just had my birthday and am really looking for a mentor.

I'm 50 and I don't have time to go back to school now. I'm too busy So I need someone to take me on a quick catch-up course on how to do such things and guide me through the maze of how to do things like this.

that would be great. These are my three wishes.

(applause)

Information technology grows exponentially.

not linear. And our intuition is linear.

When we walked through the savannah a thousand years ago, we linearly predicted where the animal would be, and it worked. It's hardwired into our brains.

But the exponential pace of growth is what information technology is all about.

And it's not just a calculation.

There is a big difference between linear growth and exponential growth.

Take 30 steps in a straight line, 1, 2, 3, 4, 5, and you reach 30.

Take 2, 4, 8, 16 exponentially 30 steps and you reach 1 billion.

It makes a big difference.

And that's exactly what information technology stands for.

When I was a student at MIT, we all shared one computer that took up the entire building.

The computers in today's cell phones are a million times cheaper, a million times smaller, and a thousand times more powerful.

That's a billion times more capacity per dollar than I've experienced since I was a student.

And we plan to do the same again in the next 25 years.

Information technology progresses through a series of S-curves, each representing a different paradigm.

So people say, "What happens when Moore's Law ends?"

It will happen around 2020.

Then move on to the next paradigm.

And Moore's Law wasn't the first paradigm to bring exponential growth to computing.

The exponential growth of computing began decades before Gordon Moore was born.

And it doesn't just apply to calculations.

This is really any technology that can measure the properties of the underlying information.

There are 49 famous computers here. I made a logarithmic graph.

This represents a trillion-fold increase since the 1890 Census, so the logarithmic scale hides the magnitude of the increase.

In the 1950s, tubes were shrinking and getting smaller and smaller. They finally hit a wall. The tube could not be shrunk any further to maintain vacuum.

And while that was the end of tube shrinkage, it wasn't the end of computing's exponential growth.

We moved on to the fourth paradigm, transistors and finally integrated circuits.

After that, we move on to the sixth paradigm. Three-dimensional self-assembled molecular circuits.

But in fact, even more amazing than this staggering scale of progress is how predictable it is.

So this means we've weathered deep and thin, war and peace, boom and bust.

The Great Depression did not affect this exponential progress.

The same thing will happen in the current economic recession.

At the very least, the exponential growth of information technology capabilities will continue unabated.

And I've updated these graphs.

Because, in my book, The Singularity is Coming, I cover things up to 2002.

So I've updated them to 2007 for you to see here.

Then he asked me, "Are you nervous?"

Perhaps this exponential progress didn't stop there. ”

I've been doing this for 30 years and this exponential progress has been maintained, although I was a little worried that the data might not be correct.

Look at the graph here. In 1968 you could buy a single transistor for a dollar.

Now you can buy $500 million. In fact, they are better because they are faster.

But look how predictable this is.

And I think this knowledge is overfitted to historical data.

I've been making forward-looking predictions like this for about 30 years.

And the cost of the transistor cycle, a measure of electronics price-performance, is falling almost every year.

That's a 50 percent deflation rate.

And that's true for other examples, such as DNA data and brain data.

But we more than make up for it.

In fact, we ship more than double all forms of information technology.

Over the past half-century, the stagnant amount of money in all forms of information technology has grown by 18%, despite the fact that we can double the amount every year.

This is a completely different example.

This is not Moore's Law.

The amount of DNA data we sequence is doubling every year.

Costs are halving each year.

And this has been going well since the Genome Project's inception.

And halfway through the project, skeptics said, "Well, this is not going to work. We're halfway through the genome project, and we're one percent done with the project."

But it really was on schedule.

Because if you double 1% 7 more times, that's exactly what you get: 100%. And the project was completed on schedule.

Communication Technology: Measured in 50 different ways, the number of bits transferred, the size of the Internet.

But this is progressing at an exponential pace.

This is radical democratization.

More than 20 years ago, when the Soviet Union was in its prime, I wrote in The Age of Intelligent Machines that this growth in distributed communications would sweep the Soviet Union away.

And as we move into the 21st century, there will be a lot of computation to do things like simulate regions of the human brain.

But where can you get the software?

Some critics say, "Oh, the software is still in the quagmire."

But we are learning more and more about the human brain.

The spatial resolution of brain scans is doubling every year.

The amount of data we get about the brain is doubling every year.

And we show that this data can indeed be translated into working models and simulations of brain regions.

About 20 regions of the brain have been modeled, simulated and tested. Cerebellum, where skills are formed. It's the part of the cerebral cortex where we think rationally.

All of this facilitated very smooth and predictable productivity gains.

Thanks to this information technology, the value of the average human working hour has risen from $30 to $130 at a fixed dollar.

And we are all concerned about energy and the environment.

Now this is a logarithmic graph.

This represents a smooth doubling of the amount of solar energy we produce every two years, especially as we now apply nanotechnology, a form of information technology, to solar panels.

And eight times more to meet 100% of our energy needs.

And we have 10,000 times more sunlight than we need.

Eventually it will merge with this technology. It's already very close to us.

It was across campus when I was a student and now it's in my pocket.

What once occupied a building now fits in our pockets.

What fits in our pockets today will fit in our blood cells 25 years from now.

And as we get closer and closer to this technology, we will actually begin to deeply affect our health and intelligence.

On this basis, here at TED, in true TED tradition, we announce Singularity University.

It's a new university founded by Peter Diamandis who is here and myself.

It is backed by NASA, Google and other leaders in the tech and scientific community.

And our goal was to bring together leaders, both teachers and students, in the rapidly growing information technology and its applications.

But Larry Page gave an impassioned speech at our organizational meeting, saying that we should dedicate this research to actually addressing some of the great challenges facing humanity.

If we do, Google will also support this.

That's what we did.

The final third of the nine-week summer intensive sessions will be devoted to group projects to tackle humanity's greatest challenges.

For example, applying the Internet, which is currently widespread in rural China and Africa, to provide health information to developing regions of the world.

And these projects will continue after these sessions using collaborative interactive communication.

All intellectual property created and taught will be made available online and developed collaboratively online.

This is our inaugural meeting.

But this is what is being announced today.

Its permanent headquarters will be at the NASA Ames Research Center in Silicon Valley.

There are various programs for graduate students and executives of various companies.

The first six tracks here (Artificial Intelligence, Advanced Computing Technologies, Biotechnology, and Nanotechnology) are various core areas of information technology.

And apply them to other areas such as energy, ecology, policy law and ethics, and entrepreneurship to help people bring these new technologies to the world.

Therefore, we are very grateful for the support we have received from both intellectual and tech leaders, especially Google and NASA.

This is an exciting new business.

Please join us. thank you very much.

(applause)

Traveling here by plane has a huge impact on the planet.

I put 9 tons of CO2 into the atmosphere. That's the weight of two elephants.

I'm here to talk about ecology, and in one year I emit as much CO2 as one Frenchman.

So what do i have to do?

Do I have to kill the French when I get home?

(Laughter) As we always do, carbon offsets have to be done differently.

(Laughter) Actually, my job is to show the impact we have on the planet.

Here are some examples of the last photos I took last year.

Alberta sand oil, heavy pollution.

you know the problem We don't want to believe what we know.

In Alberta, people work around the clock to extract as much oil as possible.

We know about the end of oil.

Oil sands are not a long-term solution.

But we use three times as much oil as we discover each year.

We don't want to believe what we know.

rejection.

New Caledonian coral reef.

Corals could be 100% gone by 2050 due to global warming.

You know that corals are very sensitive to temperature and are very important for marine biodiversity.

Arctic. This photo was taken last summer.

Fifteen years ago it would have been impossible to take this photo.

A new road is now opening between the Atlantic and Pacific Oceans.

Arctic thickness has decreased by more than 40% since 1960.

There is a new face of ice-free Kilimanjaro.

sad photo.

80 percent of the ice has been lost.

Scientists say that in 100 years all glaciers on the mountain will disappear.

Glaciers are very important to life on earth.

As Al Gore said, 2 billion people live on water from Himalayan glaciers.

Return of the fishmen.

One-fifth of mankind depends on fish for survival.

Today, 70% of fish stocks are overfished.

According to the FAO, by 2050 there will be no major marine resources unless the fishing system changes.

We don't want to believe what we know.

Beautiful photo by [unintelligible] in Africa.

1 in 6 people in the world do not have enough to eat.

1 billion people can't eat enough.

Maize is one of the staple foods in many places in Africa.

Here in America, 90 percent of the corn grown is used for animal feed and oil production.

Palm tree plantation in Borneo.

We lose 50,000 square miles to deforestation each year.

Darfur refugee camp.

There are currently 20 million refugees in the world.

According to the United Nations, there will be 250 million refugees by 2050.

I always show my pictures on the street.

We already have 100 exhibitions in the city.

But how can we understand the world without people's voices?

The scenery alone was not enough.

It was clear to me to do another job.

I started a project called Six Billion Others.

I sent six photographers around the world asking the same questions about life, the same important questions.

We conducted 5,000 interviews.

I will show you this.

Man: What is the most beautiful thing that has happened to me in my life?

When my father said to me, "I will give you this child as my fiancée."

Woman: Love? It's great to have love.

Second Man: Romeo and Juliet, Sassi and Panno, Dodi and Diana, Heer and Ranja, this is love! Third Man: My greatest fear is...

Woman: That's a tough question.

Fourth: I live happily, but what else can I do?

Fifthman: The first thing I remember... (Sixman: That's how my mother taught me) Fifthman: ... Since I was a kid, (Sixman: We should respect people.) Fifthman: We used to enjoy cycling. (Sixth Man: I'll never forget those words.) Seventh Man: We invented stories and flew around the world from our attic.

Aitman: I had a good laugh today.

9th Person: Look, my family is… awful.

10th person: The word life has life.

Eleventh: "Who am I?" Isn't that the biggest question?

Number 12: If I were to go back to Iraq and talk to people, I would have to bow my head and kiss their feet.

Just like when that woman tried to kiss my feet when we had our boys.

I feel embarrassed.

And I am humbled by their strength.

And I will forever feel the need to pay reparations to Iraq.

Second Woman: Dad, Mom, I'm all grown up.

You don't have to worry about me Dad doesn't have to go to work.

My family... what can I say?

Now my family is very poor, so my life here in Shenzhen is just to show myself that I can earn more, and to let my parents stay and make a living.

I don't want them to spend the rest of their lives in poverty.

If I achieve something one day, I want to say thank you to my mom and dad.

thank you.

Thank you for feeding and nurturing me and making my life what it is today. thank you.

Person 13: After 7 years in a wheelchair, I've done more in my life sitting in a chair than getting out of it.

I still surf. I sail the world do freediving.

Many people said it can't be done.

And I think it comes from a connection with nature, a connection with the energy of life. Because we are all disabled in some way on earth, spiritually, mentally and physically.

I understand the easy part.

Person 14: Let's say you and I like each other.

you are from somewhere else.

you don't know me i don't know you.

We do not lie.

If you like it, give us a cow and many other things and we will be friends.

How can we make it all by ourselves?

(Applause) YAB: You can also go to the website and answer the questions.

40 important questions.

I'm going to tell you about my film.

For the past three years I have been photographing Earth for a film.

The name of the movie is "Home" - "Maison".

It's about the state of the earth.

A wonderful story about life on earth.

We are very honored to show you the teaser.

Video: This planet is 4.5 billion years old.

These plants are hundreds of millions of years old.

And it's only been 200,000 years since we humans started walking upright.

We have successfully adapted and conquered the entire planet.

Like millions of other species living next to us, we have raised our children for generations.

For the past 30 years, I have observed the Earth and its inhabitants up close from the skies.

Our lives are tied to the well-being of the planet.

We depend on water, forests, deserts and oceans.

Fishing, breeding and agriculture remain the most important human occupations in the world.

And what unites us is far greater than what divides us.

We all share the same need for the gifts of the Earth, the same desire to be better than ourselves.

Yet we continue to build walls to separate us.

Our greatest battle today is to protect the earth's natural bounty.

In less than 50 years, we have changed it more than the entire history of mankind.

Half of the world's forests have disappeared.

Water resources are in short supply.

Intensive agriculture depletes the soil.

Our energy sources are not sustainable.

The climate is changing.

we are putting ourselves at risk.

We are just trying to improve our lives.

However, the gap between rich and poor continues to widen.

We still don't realize that the Earth is going at a much faster pace than it can sustain.

We know solutions are available today.

We all have the power to change this trend for the better.

So what are we waiting for?

(Applause.) YAB: Luc Besson is a film producer.

But it's no ordinary movie.

The film will be distributed for free.

This movie has no copyright.

On June 5th, Environment Day, everyone can download movies on the Internet.

The film will be offered free to TV and theater distributors for release on June 5th.

This movie has no business.

Available for schools, cities, NGOs and you too.

we have to believe what we know.

Let me tell you one thing.

It's too late to be pessimistic, really too late.

We have all parts of the solution.

Finally, I would like to welcome the birth of the 4,700th baby since this talk began.

Thank you very much. I love you.

(applause)

"Better Man".

Acquisition and maintenance were better for me.

You were good at wasting. I was better at grabbing and heaping food, but who was better after all?

Yes, who was the better man, my friend?

You were good with lords and ladies, but I was good at plundering Troy. You were better at kissing babies, and I was better at searching and destroying.

But who was the better man, old man?

who was the better man?

I was better at improvising and you were better at spinning plates. I was better at procrastinating and you were better at quiet discussions.

But who was the better man, dude?

who was the better man?

You were better at rolling reefers, and I was better at cola and rum. Remember those nights on the beach in Ibiza?

Maori twins with butt tattoos?

But Grandma, who was the better man?

who was the better man?

Now, coming to the point, my relatives are grieving.

I walked out into the hall with alligator tears. Now you're out of there, now you're gone, what I've been meaning to tell you for years now that they've sealed your ass and your ears, and years, years, old friends...

So you were the better person after all? You could have been better, my friend.

(Applause) I wrote this poem for my mother.

We all have mothers. There is only one mother. If you are lucky enough to know your mother, she is probably the most important person in your life.

My mother was definitely the most important person in my life.

Let's describe her.

she is 86 years old. She is weak.

White and platinum hair.

why would they do that? Why do grannies go to hairdressers to make helmets?

(laughs) Bright like a button. All ducks are in a row.

It looks like a pretty clean version of Margaret Thatcher (laughs), but none of the softer parts of Margaret's character are there.

(Laughter) I wrote this poem for her. These are not my beliefs.

But my mother lived by this creed all her life.

"Never go back."

never go back. never go back.

Never return to your youthful lair.

Continue on the beaten path. Memories contain all the necessary truths.

never look back. never look back.

Never give in to the Gorgon's gaze.

Continue on the beaten path. No one is waiting, nothing.

never go back. never go back.

Never give up the future you have earned.

Continue on the beaten path. Never go back to a bridge once built.

never look back. never look back.

Never retreat to the 'glorious past'. Continue on the beaten path. Treat each day of your life as the last.

never go back. never go back.

Never acknowledge ghosts on the stairs.

Continue on the beaten path. No one is waiting, nothing.

(Applause.) Now, ladies and gentlemen, I'm obsessed with my hobby.

If there were a commercially oriented cosmetic surgeon tethered end to end along the tracks, it would be me fueling trains without hesitation around the world.

Ladies, please stop doing that.

stop it.

You think we want you to do it, but we don't want you to do it.

Stop.

tell them to go to hell.

Your body is great the way it is.

leave me alone

"To a Beautiful Woman of a Certain Age"

Miss, please don't cry.

What is gone is gone. please go to sleep

Please turn the pillow. dry your tears

Count your sheep, not your years.

Nothing good will come of this.

Time rules everything, dear.

It would be foolish to start a war against someone who has never lost before.

Ladies, all this is in vain.

Youth never comes back. We drank summer wine.

No one can make a seam in time.

Please sandwich it until the crack of destruction.

What is foretold in the womb may not be foretold in gold.

You also cannot buy or sell time.

Dear, do I love you less?

Will your caresses make me wither?

do you think i shouldn't care?

Nothing has ever been so fair!

Ladies, don't cry -- what's gone is gone. please go to sleep

Lean on me, calm your fears, and count your blessings, not your years.

(Applause.) Ladies and gentlemen, America is economically doing for me what Britain has ever done or could ever do.

As you probably guessed, I was born in England.

Even when I had the worst attitude, I found myself automatically defending the United States against the cynicism of the green-eyed Europians who turned the Greek card into the Roman trump card.

America is an empire.

I hope you understand now.

By definition, all empires are clumsy, shoddy, bullied, and bureaucratically troubled, even though they were convinced in their childhood of the correctness of their cause, because they were corrupted by the power under their rule.

Gentlemen, I am not a historian.

But the sins of the United States appear to be of a milder kind, if more widespread, when compared to many previous imperial sins.

Let me be frank.

Dear friends of Birmingham, if Americans are so fat, stupid and ignorant, how come they rule the world?

"Long live the American gods."

Long live the American gods!

Long live the gods of dreams.

Undefeated among many.

But which one will reign supreme?

Which Jupiter is America?

Brahmin of Capital Hill?

A magician's profit on Wall Street?

Will they be eyes on dollar bills?

Or are you a celebrity?

Worship of people we hate.

Or the worship of living forever, if you watch your weight.

What will happen to the media giants?

Or a Hollywood siren call?

What will become of the Temple of Justice, with its servants enslaving us all?

What will happen to brands and labels?

What about emerging sports?

And what about the constitution? That last-resort bully?

Salute to the American God whose power the public admires -- convenience rules America. Convenience owns our soul.

Yes it will.

(Applause.) And if you want to know why I'm not the father, who miraculously has 22 godchildren, the answer is in this poem, and it shakes me every time I read it.

"Love came to visit me."

Love came to visit me shy like a fawn.

But seeing that I was busy, she fled at dawn.

When I was 20, the flame of resentment was lit.

My anger at the injustice was burning hot.

A lava flow has removed all its paths.

Allies and foes fled their wrath.

But the lovers grew wary, and once the novelty wore off, they lied to the bloody man, and their fear was genuine.

At the age of 30, I thought that power was mighty.

I shook the fruit of my rivals from the tree.

By cunning and outrage, day and night I beat and threw fools out of the way.

And women became more willing to lie and bluff.

Their trinkets and baubles are not very expensive.

Until I was 40 and 50, I wineed them and fed them like a pig in a sty.

We have feasted, we have reveled, we have swamped ourselves, we have forgotten danger, we have forgotten to stoop, we have forgotten the times when arrows are sharper than knives.

My stomach hurt and I was fed up with life.

Love came to visit me shy like a fawn.

But seeing that I was busy, she fled at dawn.

(Applause.) Well, that's because I have too much money and too much fun with my business.

So, ladies and gentlemen, poetry was a complete shock to me.

I am completely shocked. I was a little sick.

Well I was sick.

Well, I had a life-threatening illness.

i was in the clinic. I wasn't even allowed to make phone calls.

I wasn't allowed to see anything of my own.

So finally I begged the nurse for a pack of post-its.

And I begged another nurse for a pencil, a pen.

And I didn't know what else to do. So I started writing poetry.

It was October 2000.

i'm not a bad person

But sometimes I put myself in the bad guy's shoes.

I'm not the gorgeous, great-looking woman who walks into a room and knocks men down.

But sometimes I try to put myself in that position.

(Laughter) It wasn't very successful.

But for me it's interesting. I love writing historical poetry.

I love thinking about what they thought and what it was like.

Because a lot of the speakers, a lot of the audience, you guys aren't just going to the moon, but you know, they're going to change everything completely.

Cloning changes everything. Voice navigation changes everything.

don't know. You can do whatever you want.

You are so smart, ladies, you can do anything!

But human nature does not change.

My friend, human nature is exactly the same as when my ancestors—probably were my ancestors—put their hands around the neck of the last Neanderthal and beat that bastard to death.

You think we didn't do that?

Oh yeah.

We killed them all.

Inch by inch we killed them.

We hunted them down wherever they were.

meat rival. Berry's rival.

Geniuses have gathered in this room and we are still doing it.

Nothing in our nature has changed.

And they never will.

Even if we left this little planet and put some of our eggs in other baskets.

And I'm just as bad as you.

For eight years, I ran one of the most successful publishing businesses in the world.

And every night at 7 o'clock I took some more girls, already depraved.

I didn't do anything to anyone who didn't.

And I took crack cocaine every night for seven years.

It was like Dante's "Inferno".

It was incredible.

One derivative of crack cocaine is to maintain an erection for about four hours.

And you are up until 12:00.

It was absolutely unbelievable.

I have 22 godchildren.

What should I say to them?

I just stopped because I thought what would happen to my mother if she got caught.

If you are a woman, remember that.

Love for your son can completely change his behavior.

"Our Lady in White".

She looked pale and listless. and soft to the touch.

A generous mistress who was loved by many.

Side by side, night after night, we stocked and sold her - Our Lady in White.

We gasped, but to savor her crystalline caresses.

We wanted to cherish the hem of her dress.

We chatted, refusing to quench our thirst.

But we always scrambled to lie down with her first.

In her absence, we missed her and were gaunt and limp.

Playing with your sister or threatening a pimp.

Babel has contacted us and the lady is back!

And we took her on the table in turn.

Tyranny sensed the power it craves, and then she enslaved us.

There were many who longed for her kisses.

Embarrassed, I ran away from the abyss.

Just that.

(applause)

I used to be a Malthusian.

This was my mental model of the world. Exploding population, small planet. It will lead to ugly things.

But I forgot about Malthus. Because we think it may be about 150 years before some kind of new enlightenment.

Here's why.

This is United Nations world population data.

And the world's population is expected to peak at just under 10 billion, hopefully, in the second half of this century.

After that, it will probably start to decline.

So what then?

Most economic models are built around scarcity and growth.

As such, many economists focus on population decline and predict stagnation, perhaps even a depression.

However, population decline has at least two very beneficial economic effects.

The first is that a small number of people own a certain amount of land, making it unfavorable to invest in real estate.

In urban areas, much of the real estate value is actually shrouded in speculative value.

Eliminate land speculation and reduce land prices.

And it will begin to lift a heavy burden from the world's poor.

Second, a declining population means a shortage of labor.

A labor shortage drives up wages.

Rising wages also ease the burden on the poor and working class.

I'm not talking about a rapid population decline like we saw with the Black Death.

But look what happened in Europe after the plague epidemic. Rising wages, land reform, technological innovation, and the birth of the middle class. Then advanced social movements like the Renaissance and later the Enlightenment movement began.

Most of our cultural heritage tends to glorify and look back on the past.

All Western religions begin with the concept of Eden, go through a kind of debauched present, and lead to a very ugly future.

In short, human history is seen as something of a descent from the good old days.

But I think about two generations after the top of that curve, we'll be on the cusp of a new shift as the effects of population decline begin to settle.

At that point, we will again start romanticizing the future rather than the uncomfortable, brutal past.

So why is this important?

Why talk about socio-economic movements that are more than a century old?

Because transition is a dangerous time.

There are some powerful interests that fear the future as landowners start to lose money and workers demand more wages.

Fear of the future leads to some rash decisions.

A positive outlook on the future may help us accelerate and overcome that tipping point instead of sliding off a cliff.

If we can get through the next 150 years, your great-grandchildren will forget all about Malthus.

And instead, they will plan for the future and begin building a 22nd century enlightenment.

thank you.

(applause)

what is happening to the climate?

It's unbelievably bad.

This is obviously the famous view of the North Pole now, but it will probably disappear at this point in the next three, four, or five years. very, very, very scary.

So we all think what we can do.

And when looking at CO2 sources worldwide, 52% are associated with buildings.

Interestingly, only 9 percent are passenger cars.

So we escaped to the sushi bar.

And at that sushi bar we came up with a great idea.

It was called Eco Rock.

And we said we could redesign the 115-year-old gypsum drywall process that produced 20 billion pounds of CO2 annually.

It was a big idea. We want to reduce that by 80%, and we've done just that.

Our company started research and development in 2006.

We decided to use recycled components from cement and steel production.

This is the inside of our laboratory. I've never seen this before.

But to get it right and hit the target, employees had to run about 5,000 different mixes.

And they worked really, really, really hard.

So we built a production line in China.

Unfortunately, this production facility is no longer manufactured in the United States.

I installed the line over the summer.

We started from there with absolutely nothing.

For the first time, we see a brand new drywall production line that is completely plaster free.

That is the completed production line.

The first panel was launched on December 3rd.

So basically the slurry is poured onto the paper. That's how the line runs.

Interesting look at people's faces.

People who have been working on this project for a few years.

And they are so excited. That is the first board removed from the line.

Vice President of Operations kissing the Board of Directors. Obviously very, very excited.

However, this has a very large impact on the environment.

Then just a few weeks later we signed the first panel and had a great signing ceremony to make these products available to people around the world.

And we got "Cradle to Cradle Gold" for this.

We recently won Popular Science's Green Product of the Year for "The Re-Invention of Drywall".

thank you. thank you.

What we've learned here is the equivalent of 8,000 gallons of gasoline to build a house.

You probably didn't know anything. It's like going around the world six times.

we have to change everything.

Look around your room. We have to change the chairs, the wood, everything around us. Otherwise, I'm not going to lick this issue.

Anyone can do it, so don't listen to people who say you can't.

And these job losses can be solved with green-collar jobs.

We have four plants in our house. We're building stuff like this all over the country.

I'll go ASAP.

2.5 million cars worth of gypsum, or CO2. right?

So what do you do? I will tell you what I did and why I did it. And I know my time is up.

That's my kids, Natalie and David.

When we have kids of our own in 2050, we want to look back at grandpa and say, 'Well done, you did your best on that team.'

So my hope is that when you leave TED, you'll focus on reducing your carbon footprint in ways you can.

If you don't know how, find me. I will help you.

Last but not least, Bill Gates, I know you invented Windows.

Wait until maybe next year to find out what kind of window we invented.

Thank you very much.

(applause)

When Ethic and Hedge arrive at the forest, the dawn and the train are collapsing.

The adventurers recovered the first artifact, the Node of Power, and came to 198 Forest in search of the second.

Here they are welcomed by Octavia, the head of the colony.

She founded this treehouse reserve after robots freed everyone from having to work.

It was meant to be a haven where people could follow their passions, start crafting and find fulfillment.

They did… at first.

A few years ago everyone forgot that point.

They abandoned arts and crafts and instead exhibited their own photographs, painted over and over again.

The location of the second artifact is no secret. It's in a tower guarded by a bot garrison, a bottomless ravine, and no one knows what other traps it holds.

As soon as the tower was raised with the node inside, human communications on the ground went black.

Octavia has been chasing it for years, but no matter how hard she tries, the defenses get in the way of her.

To reach the tower, the team also needs distraction.

Octavia has the idea of ​​inciting people through well-meaning vandalism.

The population pictures are all squares of different sizes, all with an odd number of pixels across.

A helper bot picks up the finished portrait and hangs it in a public place for everyone to see.

Hedges have only a short amount of time to access the paintings.

If he smudged each one with an X, people would blame the helper bots and give the team a much-needed distraction.

I wish it was so easy.

Hedge can't just paint X's. His paint processor needs very specific instructions.

You can treat your painting as a grid of squares and fill one pixel, or small square, at a time.

He can move forward and turn 90 degrees on the canvas, but he cannot move diagonally.

In ethics, how is Hedge programmed to draw an X over each portrait?

Stop now and figure it out for yourself.

Here are some tips.

Try drawing a grid of squares like this and simulating a hedge path on it.

What patterns can you find to guide him?

Stop now and figure it out for yourself.

The challenge here is to create a set of instructions that work on any square grid.

Fortunately, one of the strengths of programming is the flexibility to solve not just one problem, but an entire class of problems at once.

It is often helpful to start with one case and work your way up to the general case.

Let's say we have this square.

Hedge can measure edge lengths and store the numbers as variables.

What we need now is a plan for how the Hedge will draw the X pixel by pixel.

There are multiple correct answers on how to do this. Let's look at two.

First, what if the hedge worked line by line like a typewriter?

For a 9px by 9px paint, paint on the first line, skip line 7, and paint again.

For the second line, skip the first line and paint, skip the fifth line and paint.

and so on.

The pattern here is that for each row, the first skipped pixel is incremented by 1 and the middle skipped pixel is decremented by 2.

Things get more complicated when the hedge reaches the center.

Here we have a line with only one pixel painted.

Then the whole thing is reversed. The number of skipped pixels decreases by 1 each time on the left side and increases by 2 each time on the center.

Telling Hedge to do this in a series of loops works and is a perfectly fine solution.

The main drawback is that this requires quite a bit of logic. That means you need to know what to do along the way, when to undo the process, and exactly how to undo it.

So how should we approach it to keep the logic consistent from start to finish?

A key insight is to view the grid as a series of concentric squares.

Each square follows the same pattern. The corner pixels are painted and the pixels in between are unchanged.

So if you can find a way to paint one nested rectangle, transition to the next rectangle, and repeat, you can paint all the rectangles.

Painting the outermost layer is easy.

Start from the corner and paint that pixel.

If n is the length of the picture, it flies n minus 1 spaces forward.

Paint another pixel and turn right.

Do it all over again…and again.

It then moves forward one less space, turns right, flies forward once, and the hedge is on the next concentric square, ready to repeat the whole process.

Each square is n minus 2 pixels smaller in length and width than the last square, and this spiral pattern can be traced to the center using variables that track how far the loops and hedges fly.

Is one of these methods better than the other?

It really depends on what you value.

Spiral's strength is the simplicity of finding patterns and reusing the same logic from start to finish.

The advantage of the typewriter approach is that it is a more generalized solution, i.e. much easier to adapt to fill any pattern.

Ethically, either is fine.

So what happens?

Hedge quickly defaces all portraits.

And at that moment, a cry of pain echoes through the forest.

The garrison guarding the tower abandons its post to calm the agitated population, and Ethic, Hedge, and Octavia slip through, nearly sliding into the deep canyon between them and the tower.

This is an invention that will change the world.

Smoke alarms have probably saved hundreds of thousands of lives around the world.

However, fire alarms do not prevent fires.

More than 20,000 people are killed or injured in 350,000 house fires in the United States each year.

And one of the main causes of all these fires is electricity.

What if you could prevent an electrical fire before it started?

Well, a few friends and I figured out how to do this.

So how does electricity cause house fires?

The main cause was found to be faulty or misused appliances and electrical wiring.

Our invention had to address all these issues.

So what about circuit breakers?

Well, Thomas Edison invented the circuit breaker in 1879.

This is 130-year-old technology, but it's a problem because over 80 percent of all domestic electrical fires occur below the safety threshold of circuit breakers.

Hmm...

So we have considered all of these. Then I realized that the appliance must be able to communicate directly with the power outlet itself.

Any electrical device, whether it's an appliance or an extension cord, must be able to tell the outlet, "Hey, outlet, too much current. Turn it off before it starts a fire."

And the outlet should have enough features to make that happen.

So here's what we did: We attached a 10-cent digital transponder, a data tag, to the plug of the appliance.

We then placed an inexpensive wireless data reader inside the receptacle to communicate.

Every home electrical system is now an intelligent network.

Safe operating parameters for the appliance are built into the plug.

When excessive current flows, intelligent outlets will automatically shut off to prevent new fires.

We call this technology EFCI (Electrical Fault Circuit Interrupter).

Okay, two more points. About 2,500 children in the United States are admitted to the emergency room each year for electrical outlet-related electrical shocks and burns. this is crazy.

Intelligent outlets will always turn off until an intelligent plug is detected, preventing injury. Simple.

Now, besides saving lives, perhaps the biggest benefit of intelligent power is saving energy.

The present invention reduces global energy consumption by enabling remote control and automation of any outlet in any home or business.

You can now choose to reduce your home utility bills by automatically cycling high loads such as air conditioners and heaters.

Hotels and businesses can lock down unused rooms from a central location or even from a mobile phone.

There are 10 billion electrical outlets in North America alone.

Potential energy savings are very important.

To date, we have filed 414 patent claims.

Of these, 186 have been approved and 228 are in the process.

And just three weeks ago, we are happy to announce that we have won our first international recognition, the 2009 CES Innovation Award.

In conclusion, intelligent power could save thousands of lives, prevent tens of thousands of injuries and eliminate tens of billions of dollars in property damage around the world, while significantly reducing global energy consumption.

In the spirit of this year's TED conference, we believe this is a powerful, world-changing invention.

And I want to thank Chris for giving me this opportunity to expose our technology to you, and soon to the world.

thank you.

(applause)

In June, just after heavy rains, the sky is filled with unusual creatures.

At first glance, this may be an unpleasant sight.

But for lucky males and females of Solenopsis invicta, also known as fire ants, this day is a day of romance.

This is a mating flight, in which thousands of fertile male and female ants, called alates, flap their first and last wings.

But even for males who manage to avoid winged predators, this frenetic mating proves fatal.

And the work of successfully mated females has only just begun.

Having secured a life's worth of sperm from a deceased spouse, our new queen must single-handedly launch an entire colony.

It descends to the ground to find a suitable place to build its nest.

Ideally, you can find a spot with loose, easy-to-dig soil, such as farmland that has already been disturbed by human activity.

Once she finds the perfect spot, she folds her wings to create a stub that establishes her royal status.

She then begins digging a descending tunnel that ends in a room.

Here the queen bee begins laying about 10 eggs a day, with the first larvae hatching within a week.

Over the next three weeks, the new queen relies on another batch of unfertilized eggs to nourish both herself and her brood, losing half of her body weight in the process.

Thankfully, after about 20 days, these larvae have matured into first-generation worker bees, ready to forage and support the shrunken queen.

But the daughters will have to work urgently. It is urgent to restore the health of the mother.

Around dozens of neighboring queen ants build their own ant army.

These colonies have lived together peacefully until now, but when worker ants emerge, a phenomenon known as mass raids begins.

Worker bees in the nest a few meters away begin to steal offspring from the queen.

Our colony retaliates, but new waves of raiders from further afield overwhelm the workers.

Within hours, the raiders had taken all of the queen's chicks to the largest nearby nest, and the queen's surviving daughters abandoned her.

Seeking one last chance to survive, the Queen follows the trail of raids to her triumphant nest.

She fends off other defeated queens and worker ants guarding the hive and fights for the top of the nest.

While other queens fail, her daughters help their mothers succeed, overthrow reigning monarchs, and usurp mountains of offspring.

In the end, all remaining challengers fail, leaving only one queen and one pile of chicks.

Now managing hundreds of worker ants in the region's largest nest, the Victorious Queen has begun to support the colony's main purpose: breeding.

For the next few years, the colony will produce only sterile workers.

However, once the population exceeds about 23,000, the tide changes.

Each spring from now on, the colony will produce fertile males and females of Alate.

This colony lays these larger ants throughout early summer and returns to worker production in the fall.

After heavy rains, these ants take to the skies and spread their queen genes downwind several hundred meters.

But to contribute to this frenetic annual mating, the colony must continue to thrive as one giant super-creature.

Every day, young ants feed the queen and care for her young, while older workers look for food and guard the nest.

When invaders attack, the old warriors use poison to repel the invaders.

Colonies congregate after rains and use the wet soil to spread their nests.

And when a devastating flood submerges the house, the sisters work together to board a giant raft and carry the Queen to safety.

But colonial life, however resilient, will come to an end.

After about eight years, the queen bee runs out of sperm and can no longer replace the dying worker bees.

The number of nests declines and is eventually taken over by neighboring colonies.

Our Queen's reign is over, but her genetic legacy lives on.

I'm going to talk about three of my inventions that I hope will impact 10-100 million people.

The previous movie covered some of the old things we've been doing like stents and insulin pumps for diabetics.

And I want to talk very briefly about three new inventions that will change the lives of many people.

Currently, it takes an average of 3 hours from the time a patient recognizes the first symptoms of a heart attack to arriving at the emergency room.

And people with asymptomatic ischemia (which translates to English means no symptoms) take longer to get to the hospital.

AMI (Acute Myocardial Infarction) is what doctors are blaming for the high cost --(laughter)--which means heart attack. Annual prevalence: 1.2 million Americans.

Mortality: 300,000 people die each year.

About half of them, 600,000, will suffer permanent heart damage that will lead to very serious problems later on.

Therefore, 900,000 people die or have severe damage to the heart muscle.

We are so brave that patients, especially us men, often deny symptoms. We are so brave and unwilling to admit that I have terrible chest pain.

And about 25% of all patients have no symptoms at all.

What should we do about them? How can we save their lives?

This is especially true for diabetics and older women.

So what does it take to warn of a heart attack as early as possible?

A means of determining whether a coronary artery is completely occluded.

Ladies and gentlemen, it's a heart attack.

The tool consists of doing something a little more technical, looking at the ST segment elevation (translated into English) on the ECG. This means that if there is an electrical signal in the heart and part of the ECG (called the ST segment) is elevated, it is a sure sign of a heart attack.

And by implanting a computer inside an at-risk person's body, it could save a person's life by knowing they were having a heart attack before they even had symptoms.

Well, doctors can program the level of this ST elevation voltage to trigger an emergency alert, a cell phone-like vibration right next to your collarbone.

And when it beeps, beeps, beeps, you better do something. If you want to live, you have to get treatment.

So we have to try these devices. Because the FDA won't let humans use them unless we try them first. And the best model for this happens to be a pig.

And what we tried on pigs was external electrodes on their skin, like those you see in the emergency room. I'll explain why they don't work.

A lead, or wire, is then inserted into the right ventricle of the heart to measure an electrocardiogram, or signal voltage from within the heart.

Now, for the pig, that was the signal at baseline before the pig's artery was blocked to simulate a heart attack.

After 43 seconds, even the experts couldn't tell the difference, but after 3 minutes, well, serious study could tell the difference.

But what happened when we looked inside the heart of a pig with an electrogram?

I had a baseline. First, it is a much larger and more reliable signal.

Then, even an untrained person can tell the difference, there is an ST-segment elevation just after this sharp line.

See the difference there. It doesn't take long. Any layman can tell the difference, and computers can be programmed to easily detect it.

Then watch it after 3 minutes.

We can use real heart signals to tell people they're having a heart attack and save their lives even before they have symptoms.

Then we tried it with our son, Dr. Tim Fishel, and also on some human patients who had to have stents.

That's right, he kept the balloon filled to block the artery, simulating a blockage. Here's a heart attack.

It's not hard to understand. The baseline is the first image in the top left.

In the next 30 seconds you see this rise and then this rise. This is ST elevation.

And if we had a computer that could detect it, it could tell us that a heart attack is happening very early, saving lives and preventing congestive heart failure.

And he did it again. When I inflated the balloon again after a few minutes, you can see that this part is greatly inflated even after 10 seconds. You can put a computer under your chest like a pacemaker and put a wire in your heart to make it look like a pacemaker.

And the computer won't go to sleep.

We have a small battery, and this small battery will run that computer for 5 years without having to replace it.

What is your system like?

Well, on the left is an IMD, an implantable medical device, and you can see it tonight in the tent - they put it on display.

It's about this size, about the size of a pacemaker.

Embedded with very conventional technology.

EXD is an external device that can be placed on your nightstand.

If something happens, I will wake you up and direct you to the emergency room. If you don't, you're in a terrible situation.

And finally, the programmer sets the level of stimulation. This is the level at which it is determined that a person is having a heart attack.

The FDA said, "Okay, put this final device on an animal and then test it," so we said it was a pig. So I had to give this pig a heart attack.

And we said, 'We're stent experts,' because when you go to the farm, it's not easy for pigs to have heart attacks.

Tonight you'll see some of the stents we invented.

We said we were going to have a stent, but we weren't going to have a stent like you would have in a human being.

We have copper stents, and these copper stents erode arteries and cause heart attacks.

It's not very good, but after all, we had to find an answer.

So we took two copper stents and put them into this pig's artery. Let me show you the results. This is great news for people with heart disease.

So Thursday morning we stopped the pig medicine. And then there was his electrocardiogram, and the signals from inside the pig's heart came out via radio telemetry.

Then, at 6:43 on Friday, he began to feel certain symptoms. After that we let the pigs run around. We will not discuss this early stage.

But look what happened at 10:06 after we removed this pig's heart attack medicine.

Some of you are experts in ST elevation. do you see it there?

Can you see it in the photo after the big QRS rise? Can you see the ST elevation?

This pig had a heart attack at 10:06.

What happens to this blockage after having a heart attack?

Rhythm became irregular and after 45 minutes it happened.

Then ventricular fibrillation occurs, causing the heart to tremble instead of beating. This is just before the pig's death. and the pig died. flattened out.

But we had just over an hour that could have saved this pig's life.

Well, because of the FDA, we couldn't save pig lives because we need to do this kind of animal research for humans.

But for humans, we can save their lives.

We can save the lives of people at high risk of heart attack.

What is today's response to acute myocardial infarction, a heart attack?

Well, I feel chest pain and indigestion.

It's not that bad. you decide to do nothing.

After a few hours, the symptoms worsen and the man can no longer ignore them.

Finally, go to the emergency room.

You wait until burns and other critically ill patients are treated. Because 75% of patients who come to the emergency department with chest pain don't have AMI, so it's not taken too seriously.

They finally met you. Diagnosing an electrocardiogram attached to the skin takes even more time, but it is difficult to diagnose because there is no baseline data that a computer worn on the patient acquires.

Finally, if you're lucky, you'll get treatment within 3-4 hours after the incident, but your heart muscle is necrotic.

And that's the typical cure in developed countries, not Africa. That is the typical treatment in developed countries today.

So we developed the AngelMed Guardian system, and this patient has a device called the Implanted AngelMed Guardian.

If a blockage occurs, an alarm will sound, the alarm and ECG will be sent to an external device, and the baseline ECG from the previous 24 hours and the ECG that caused the alarm will be taken so you can take it to the emergency room and show it to them for immediate care.

It is then sent to a network operations center, where the data is retrieved, for example, from a centrally located patient database in the United States.

They are then sent to a diagnostic center, where within a minute of the heart attack the signals are displayed on a computer screen and the computer analyzes the problem.

And the doctor who was there, the doctor, called you, again on your cell phone, and said, 'Mr Smith, you're in a terrible state.

We called an ambulance. An ambulance is on its way.

It will pick you up and then we will call your doctor and tell them about it.

We signal him that you are having a heart attack. And then you send that signal to the hospital, where it's analyzed, and there you're with the doctor and treated so you don't die of a heart attack. ”

That's the first invention I wanted to explain.

(Applause.) Now, I want to talk about something else entirely.

At first I didn't think migraines were a big problem because I had never had migraine headaches, but then I spoke to people who get migraines 3-4 times a week in their lives and whose lives are completely ruined by them.

Our mission statement for migraines is "to prevent or ameliorate migraine headaches through the safe and controlled application of magnetic pulses as needed by the patient."

Well, there are probably very few physicists here.

If you are a physicist, you know that there are certain Faraday's laws. Adding magnetic pulses to the salt water, in turn, creates electrical currents in your brain, and the electrical currents in your brain can eliminate migraine headaches.

That's what we discovered.

Here is a picture of what we are doing.

Patients with migraine headaches preceded by aura have bands of excited neurons, shown in red, that migrate toward the midbrain at a rate of 3 to 5 millimeters per minute.

And when it reaches the midbrain, headaches begin.

Some migraines are preceded by a visual aura. By the way, this visual aura, which I'm going to show you in a picture, starts out as a small dance of light and grows larger and larger until it fills your entire field of vision.

And what we tried is this. This is a device called a Cadwell model MES10.

It weighs about 70 pounds and has a wire diameter of about 1 inch.

And this is one of those patients who has an aura and always suffers from a severe headache after the aura. what do we do

This is what an aura looks like.

It's like a funny dance light and is shown on the left and right side.

And it is a fully developed visual aura, as seen above.

In the middle, our experimenter, a neurologist, said, "Let's turn this down a little bit and turn off half of your aura."

And by God, the neurologist has erased it. That's the center photo. A brief magnetic pulse erased half the aura.

what do you mean?

This means that the magnetic pulses are producing currents that interfere with erroneous electrical activity in the brain.

And finally he says, "Okay, from now on-" All the aura will be erased by a properly placed magnetic pulse.

What's the result? We designed a magnetic depolarizer like this. If you are a woman, you can put it in your notebook. Once you have the aura, you can try it out and see how it works.

Now, what they have to show next is what aired last week on ABC News, Channel 7, 11 o'clock News in New York City.

Anchor: There are 30 million Americans who suffer from migraine headaches, and 30 million Americans suffer from migraine headaches, and tonight we have a possible answer for you.

Tonight, Eyewitness News reporter Stacey Sager will use a small, portable machine that literally relieves migraine headaches.

Christina Sidebottom: Well, my first reaction was that it looked very gun-like and very strange.

Stacey Sager: But for Christina Sidebottom, almost anything was worth trying if it could stop her migraines.

It might seem silly or even scary to walk around with it in your bag, but Ohio researchers who are organizing a clinical trial of the migraine relief device claim it's scientifically correct -- in fact, when the average person experiences a migraine, it's caused by something akin to an electrical impulse.

The zapper creates a magnetic field to counteract it.

Youssef Mohammed: In other words, we are doing electricity with electricity instead of the chemicals we use today.

SS: But is it safe for daily use?

Experts say the study has actually been around for more than a decade and needs longer-term research. Christina swears it now.

CS: For my migraine, it was the best thing.

SS: The researchers hope to present their findings to the FDA this summer.

Robert Fischel: That's the invention that treats migraines.

(Applause.) You see, the problem is that 30 million Americans suffer from migraines. We needed the means to treat it and now I think we have it.

This is the first device we have done and I will tell you about my second wish related to this.

Conclusions from previous studies in 3 research centers showed significant improvement in pain levels after just one use.

The most severe headaches respond well after a few treatments, and an unexpected finding indicates that not only headaches with aura but even established headaches are relieved with treatment.

Then the aura is erased and migraine headaches cease.

That's the migraine invention we're talking about and currently working on.

(Applause.) The third and final invention started with an idea.

Epilepsy is best treated with responsive electrical stimulation.

Now, why do we use epileptic focus in addition?

Now, unfortunately, unlike Mr. Bono, we techies have to deal with all of these jargon.

"Reactive electrical stimulation" means that we sense where an epileptic seizure begins, at a location in the brain called an "epileptic focal point." We sense an impending epileptic seizure there and respond by applying electrical energy to the area, erasing the erroneous signals so that no clinical symptoms of migraine occur.

We use the current pacemaker-defibrillator technology used in the heart.

We thought we could adapt it to the brain.

The device can be implanted under the scalp and completely hidden, avoiding wire breakage when placed in the chest and trying to move the neck.

Start a company to develop neural pacemakers for epilepsy and other brain disorders. All diseases of the brain are the result of some electrical malfunction, causing many, if not all, brain diseases.

We founded a company called NeuroPace and started researching responsive neural stimulation. Here is a picture of what a device implanted in the skull looks like.

This is probably the better photo.

Here is a device with a frame.

I have cuts on my scalp. it is open. A neurosurgeon has a template. He marks the perimeter and uses a dental burr to remove a portion of the skull exactly the size of the device.

And tonight you'll be able to see the device in your tent.

Then attach the frame with 4 screws, fit the device and use the wire. Those shown in green are electrodes that reach the surface of the brain, the epileptic foci, where epilepsy originates. It senses electrical signals and uses computer analysis to tell you when to apply the current to prevent clinical symptoms of seizures.

On the blue wire you can see something called a deep brain electrode.

If that is the cause of your epilepsy, you can also attack it.

Comprehensive Solution: This is your device. It's about 1 inch by 2 inches, oddly enough, just about the thickness of most skulls.

Advantages of responsive neurostimulation: seizures can be detected and terminated before clinical symptoms occur, stimulation can be provided only when needed, and turned off once the seizure is over. Side effects are minimal. In fact, all clinical trials to date have shown no side effects in the 40 or so patients implanted with the device. Also, because this device is invisible and superficially hidden, if you have epilepsy and you have this device, no one will know it because you will not know it is there.

This shows what an electroencephalogram looks like, and on the left is the signal of a spontaneous seizure in one of the patients.

Then give a stimulus and you will see a thick black line appear and the EEG signal will be normal. This means they are not having epileptic seizures.

This concludes my discussion of epilepsy, the third invention I wish to discuss here this afternoon.

(Applause) I have three wishes. Well, nothing can be done about Africa.

i am a technician. I'm interested in medical devices, mostly high-tech stuff like what Bono talked about.

The first wish is to use an epilepsy-responsive neurostimulator (Responsive NeuroStimulator, a great acronym) called RNS to treat other brain disorders.

So if you're doing it for epilepsy, why shouldn't you try something else?

And have you seen what the device that woman used to cure her migraines looks like?

Let me tell you, it was made up by research engineers like myself, not the true designers of great equipment.

(Laughter) We would like to have some people who really know how to do this do some ergonomics research in order to develop an optimal design for a portable device to treat migraines.

And some of the sponsors of this TED meeting include such organizations.

Next, I'll ask TED attendees to come up with ways to improve healthcare in the United States, which has problems that Africa doesn't have.

And by reducing medical malpractice lawsuits, malpractice lawsuits are not a problem in Africa. It's an American problem.

(Applause.) So let me quickly fulfill my first wish: the brain works by electrical signals.

If electrical signals cause brain damage, electrical stimulation can overcome the damage by acting on neurons in the brain.

In other words, even if you mess up an electrical signal, you can probably cancel it by sending another electrical signal from your computer into your brain.

Signals in the brain that cause brain dysfunction can be sensed as triggers for electrical stimulation, as in epilepsy.

But even without a signal, brain damage can be turned off by electrical stimulation of the appropriate parts of the brain.

And consider treating psychiatric disorders such as obsessive-compulsive disorder, which currently includes 5 million Americans and is under-treated with drugs. Join the TED group on this one.

And Mr. Fisher, his group at Neuropace, and I believe we can make a dramatic difference in improving OCD in America and around the world.

That is my first wish.

(Applause.) My second wish is that, at this point, clinical trials of transcranial magnetic stimulators (TMS, meaning devices for treating migraines) seem to be quite successful.

Well, that's good news.

Today's portable devices are far from optimal designs, both in terms of appearance and human factors.

I think she said it looks like a gun. A lot of people hate guns.

(Laughter) We are collaborating with previously successful companies in human factors engineering and industrial design to optimize the design of the first portable TMS device to be marketed to migraine sufferers.

And that is my second wish.

(Applause.) And out of the $100,000 prize TED generously gave me, I'll donate $50,000 to help neuropace people treat OCD, obsessive-compulsive disorder, and another $50,000 to companies optimizing device designs for migraines.

That's how I use my $100,000 prize.

(Applause.) Now, the third and final wish is a little more difficult, but unfortunately it's made more complicated by the involvement of lawyers.

(Laughter.) Well, malpractice lawsuits in the United States are driving up malpractice insurance costs and keeping talented doctors out of practice.

The patient's end is so tragic that lawyers sue on the fly, hoping for a portion of the sympathetic jury's hefty settlement.

Part of the high cost of health care in the United States is due to litigation and insurance costs.

I saw pictures and charts on USA Today today that were soaring out of control, and that's one factor.

So how can the TED community help with this situation?

I have some ideas first.

As a starting point for discussion with the TED group, a major part of the problem is the nature of the written informed consent that must be read and signed by the patient or spouse.

For example, we asked people with epilepsy what they used with their informed consent.

12 pages, in a single space, can you believe a patient must read this before entering a clinical trial to cure epilepsy?

What do you think people get after reading 12 pages of single space?

They don't understand what the hell it is.

(laughs) That's the system we have now. How about making a video?

We have entertainment people here. We have staff who know how to create animated visual videos of anatomy and procedures.

We all know we could do better if we could have something visual that could interact with the patient – ​​watching a video, being videotaped, pushing – but do you understand this? No, I don't.

Now let's move on to a simpler explanation.

Then there are the simpler ones. Oh I get it.

Well, press the button and it will be recorded, you see?

And that's one of the ideas.

Videos of the patient or spouse and the medical presenter are now also being filmed, and the patient agrees that they understand the procedure being performed, including all possible modes of failure.

Patient or spouse agrees not to sue in the event of any of the known failures of the procedure.

Now, in America you can't actually waive your right to a jury trial.

But if there is a video where everything is explained and everything is saved in the video file, it's far less likely that a good lawyer will take this case by accident, because it's not such a good case.

In the event of a medical malpractice, the patient or spouse agrees to a settlement seeking fair compensation through arbitration instead of going to court.

That would save hundreds of millions of dollars in litigation costs in the United States and reduce the cost of medicines for everyone.

These are just some starting points.

So this is the end of all my wishes.

I wish I had more wishes, but I have three.

(applause)

This is called "Hooked on a Feeling: The Pursuit of Happiness and Human Design".

I made Darwin a little depressing, but I drew a very happy chimpanzee there.

My first point is that the pursuit of happiness is a duty.

Human beings can only wish to be happy, wish to be happy, and cannot wish not to be happy.

We are designed to pursue happiness, and not only enjoy it, but desire it even more.

If that is true, how much can we improve our happiness?

Well, we certainly try.

If you look on Amazon's site, you'll find over 2,000 books with 7 habits, 9 options, 10 secrets, and 14,000 thought tips that claim to bring happiness.

Now, another way we try to improve our well-being is by medicating ourselves.

And there are over 120 million prescriptions for antidepressants.

Prozac was actually the first absolute blockbuster drug.

It was clean, efficient, no excitement, no real danger, no street value.

In 1995, illicit drugs were a $400 billion business, accounting for 8% of world trade, about the same amount as gas and oil.

These paths to happiness don't actually increase happiness much.

One of the current problems is that depression and anxiety are on the rise, even though happiness rates are as flat as the surface of the moon.

Some say this is because diagnostics have improved and more people are being detected.

That's not all. We see it all over the world.

There are now more suicides than murders in the United States.

Suicide is on the rise in China.

And the World Health Organization predicts that depression will be the second leading cause of disability by 2020.

The good news here is that around the world, when polled, about three-quarters of people say they are at least pretty happy.

But this does not follow the usual trend at all.

For example, these two have had their incomes rise significantly and their happiness curves completely flattened.

My field of psychology is not very helpful in understanding human well-being.

In part, we have the legacy of Freud, who was a pessimist. Freud said the pursuit of happiness is a quest for destiny, driven by an infantile side of the individual that is never fulfilled in reality.

"It's tempting to say that the intention that humans should be happy was not part of the plan of creation," he said.

So the ultimate goal of psychoanalytic psychotherapy was actually what Freud called ordinary misery.

(Laughter) And Freud partly reflects the structure of the human emotional system. So we have both positive and negative systems, and the negative systems are very sensitive.

For example, we naturally love the taste of sweet things and dislike the taste of bitter things.

I also found that people tend to hate losing more than they enjoy gaining.

The formula for a happy marriage is 5 positive statements or interactions for every negative statement.

That's how powerful one negative is.

Especially the expressions of disdain and disgust, it really takes a lot of positive expressions to turn it around.

Include your stress response here.

We are so sensitive to imminent, physical, imminent danger that our bodies react in incredible ways when endogenous opioids invade.

Our system is very old and exists to pose a real physical danger.

And over time, this becomes a stress response that can have a huge impact on your body.

Cortisol floods the brain. It can destroy hippocampal cells and memory, causing all sorts of health problems.

But, unfortunately, this system is partially necessary.

We wouldn't be able to live if we were ruled by pleasure alone.

There are actually two command posts.

Emotions are short-lived, intense reactions to challenges and opportunities.

And each of them allows us to tune in to thoughts, perceptions, emotions and memories, switch on and click another self to drop out.

We tend to think of emotions as just emotions.

But in reality, emotions are whole-system alerts that change what we remember, what decisions we make, and how we perceive things.

So let me move on to the new science of happiness.

We are out of Freudian melancholy and now people are actively researching this.

And one of the key points in the science of happiness is that happiness and unhappiness are not the endpoints of a single continuum.

Freud's model is really a continuum: the less miserable, the happier.

that's not true. Less misery means less misery.

And that happiness is at the exact opposite end of the equation.

And it's gone. Psychotherapy lacks it.

Therefore, even when the symptoms subside, they tend to recur because they do not know what the other half of the senses are: joy, happiness, compassion, gratitude, and positive emotions.

And of course, we know this intuitively, but happiness is more than just the absence of unhappiness.

But for some reason it wasn't advocated until very recently considering these as two concurrent systems.

So the body can look for opportunities and at the same time protect itself from danger.

They are like two systems dynamically interacting with each other.

People also want demolition.

We use the word 'happiness' and this is a very large umbrella for this word.

And three emotions that cannot be expressed in English. Fierro is proud of having accomplished a challenge. Schadenfreude, it is happiness, malicious pleasure in the misfortune of others. And Natchez, it's the pride and joy of children.

Not included in this list and not included in any discussion of happiness is happiness in the well-being of others.

There seems to be no word for it.

We are very sensitive to negativity, which is partially offset by the fact that we have positive emotions.

We are also natural pleasure seekers.

Babies love sweet tastes and hate bitter tastes.

They love to touch smooth surfaces more than rough surfaces.

They like to see beautiful faces more than plain ones.

They prefer to listen to consonant melodies rather than dissonant melodies.

Babies are born with so many innate joys.

A psychologist once said that 80 percent of the pursuit of happiness is actually related to genes, and being happier is as difficult as growing taller.

That's nonsense.

Genes contribute a significant portion to happiness (about 50 percent), but 50 percent of it remains unknown.

Let's step inside the brain for a moment and see where happiness comes from in evolution.

There are basically at least two systems here, both very old.

One is the reward system, powered by a chemical called dopamine.

and it begins in the ventral tegmental area.

From the nucleus accumbens to the prefrontal cortex to the orbitofrontal cortex, decision making takes place at a high level.

This was originally thought to be the pleasure system of the brain.

In the 1950s, Olds and Milner implanted electrodes in the brains of mice.

And the rat will keep pushing that bar thousands and thousands of times.

it would be inedible. it can't sleep It wouldn't be sex.

Just pressing this bar does nothing.

So they figured this must be a brain orgasm.

It turned out not to be, but actually a system of motives, a system of desires.

It gives the object so-called incentive salience.

Something looks so tempting that you have to go after it.

It is different from the pleasure system of simply saying "I like this".

As you can see, the pleasure system is the body's opiate, the hormone oxytocin, which is widespread throughout the brain.

The dopamine system, or desire system, is much more centralized.

Another thing to say about positive emotions is that they have universal signals.

And we see smiles here.

And the universal signal isn't just about raising the edge of your lips to your big cheekbones.

There are also wrinkles on the outer corner of the eye and the orbicularis oculi muscle.

So even a 10-month-old baby can smile like this when he sees his mother.

Extroverts use it more than introverts.

People who are free from depression are more likely to have symptoms later than before.

So if you want to reveal the expression of true happiness, you'll be looking for this expression.

Our fun is really old.

And, of course, we learn a lot of fun, much of it mean. One of them, of course, is biophilia. This means that we have a very deep response to the natural world.

A very interesting study done on people recovering from surgery found that people facing a brick wall versus looking out to trees and nature, facing a brick wall had longer hospital stays, needed more medication and had more complications.

There is something very uplifting about nature and it is part of how we are aligned.

Humans, especially, are highly imitative creatures.

And we imitate from the moment we are born.

This baby is 3 weeks old.

And if you stick your tongue out at this baby, the baby will do the same.

We are social beings from the beginning.

And research on cooperation also shows that interpersonal cooperation activates the brain's reward center.

One of the problems that psychology has had is this intersubjectivity, that instead of focusing on the importance of the social brain to humans born helpless and in great need of each other, it focuses on self and self-esteem, not self and others.

It's more like "I" instead of "we".

And I think this is a really tremendous problem that goes against our biology and nature and doesn't make us any happier.

Because when you think about it, people are happiest when they are in flow, when they are immersed in something in the world, when they are with other people, when they are active, when they are engaged in sports, when they are focused on their loved ones, when they are learning, when they are having sex, or when they are doing anything else.

They are not sitting in front of a mirror trying to understand themselves or thinking about themselves.

These are not the times when you feel happiest.

Another piece of evidence, when we look at the computerized text analysis of people who have committed suicide, we find that it is there, and this is very interesting, is that the first person singular is used. First person singular forms are used, rather than "we" or "we", "I", "I", and "my", and the characters are less hopeless than actually being alone.

And being alone is very unnatural for humans.

I have a strong desire to belong.

But there are ways our evolutionary history can really trip us up.

Because, for example, genes don't care if we're happy, they care about what we replicate and pass on.

For example, reproduction is so important that there are three systems that underlie reproduction.

There is just a desire to have sex.

And it's actually mediated by sex hormones.

Romantic attraction, it goes into the lust system.

And that's the supply of dopamine. That is, "This person must be alone."

There is attachment called oxytocin, and there is the opiate, "This is a long-term bond."

The problem is, as humans, these three can separate.

Therefore, a person may become attached for a long time, become romantically infatuated with someone else, and want to have sex with a third party.

Another way our genes mislead us is social status.

We are very perceptive of our social status and always strive to improve it further.

Now, in the animal world, the only way to gain status is through domination.

I take the lead with my physical prowess and keep it with my chest up, and you make a submissive gesture.

Now, man has an entirely different way to rise to the top, and that is the way of free-for-all prestige.

We give status to someone because they have expertise or knowledge and know how to do things.

And it's clearly a way to create more status niches so that humans don't have to be subordinated in the status hierarchy like they are in the animal world.

This data is not very supportive of money buying happiness.

But it is not irrelevant.

So when you look at life satisfaction questions like this, you see that life satisfaction goes up with each increase in income.

It can be seen that the lower the income, the greater the mental distress.

So obviously it has some effect.

However, the effect is relatively small.

And one of the problems with money is materialism.

If you chase money too hard, you forget the real and basic pleasures of life.

So here is this couple.

"Do you think less fortunate people are better at sex?"

And this kid right here saying, "Put the toys down and leave me alone."

So one thing is that it actually takes over.

The whole dopamine-seeking system hijacks and derails every pleasure system.

Maslow had the idea in the 1950s that as people transcend their biological needs, the world becomes safer, and as we no longer need to worry about our basic needs being met—whatever motivates us, we can think beyond ourselves toward self-actualization and transcendence—and transcend the materialist.

Therefore, I would like to conclude briefly with some short data suggesting that this may be the case.

One is people who have experienced so-called quantum changes. They felt their entire lives and values ​​changed.

And sure enough, if we look at the types of values ​​coming in, we find wealth, adventure, achievement, joy, fun and respect before the change, and more post-materialistic values ​​after the change.

Women experienced a completely different shift in values.

But in the same way, only happiness survived there.

They moved from glamor and happiness, wealth and self-control to generosity and generosity.

I will end with some quotes.

"I have only one question. How do you love this world?"

Rilke said, "If your daily life seems poor, don't blame yourself for it.

Tell yourself that you are not a poet enough to evoke that richness. ”

"First, tell yourself what will happen to you.

Then do what you gotta do. ”

thank you.

(applause)

Today, let me share with you a seminal discovery.

But I want to tell you that it actually happened. It's not the kind of thing you present at a scientific conference or read in a scientific paper.

This is a story that goes beyond biomimetics to what I call bioreciprocity.

I define it as the connection between biology and another field. There, each field advances each other, but the collective discoveries that emerge go beyond any single field.

Now, from a biomimetics perspective, as human technology incorporates more of nature's features, nature becomes a more useful teacher.

Engineering can draw inspiration from biology by using its principles and analogies where advantageous, and integrate it with the best of ergonomics to ultimately create something actually superior to nature.

Now, as a biologist, I was very curious about this.

This is a gecko leg.

And we wondered how they used these strange toes to climb walls so quickly.

we found it. And what we discovered was that their toes had leaf-like structures, millions of tiny hairs that looked like rugs, and each of those hairs had the worst possible split ends, about 100-1000 nano-sized split ends.

And individuals have 2 billion of these nano-sized split ends.

Does not stick with velcro, suction or glue.

In fact, they stick together only through intermolecular forces and van der Waals forces.

And today, I am very happy to announce that the first synthetic self-cleaning dry adhesive has been produced.

From the simplest version in nature, one branch, my engineering collaborator at Berkeley, Ron Fearing, created the first synthetic version.

So does my other great collaborator, Mark Cutkosky of Stanford University. He made much larger hairs than the gecko, but used the same general principle.

And this is the first test.

(Laughter) That's my former PhD student Keller Autumn. Now a student and professor at Lewis and Clark College, he literally gave up his first child for this exam.

(Laughter) Just recently, something like this happened.

Man: This is the first time someone actually climbed with this.

Narrator: Lynn Belinski, a professional climber who seemed brimming with confidence.

Lynn Belinski: To be honest, it's perfectly safe. You will be completely safe.

Man: How do you know?

Lynn Belinski: Because we have liability insurance. (laughter) Narrator: With the mattress down and the safety rope attached, Lynn begins the 60-foot climb.

Lynn has risen to the top with the perfect combination of Hollywood and science.

Man: So you're the first human to formally emulate a gecko.

Lynn Belinski: Ha! oh. And what a privilege it was!

Robert Full: That's what she did on the rough surface.

But she actually used these on smooth surfaces and used two of them to climb and pull herself up.

In the lobby, you can try out gecko-inspired materials.

Now, the problem with robots that do this is that they can't break the bond with the material.

Here is gecko's solution. In fact, they peel their toes off the surface at high speeds as they run up walls.

Well, today I am really excited to show you Stickybot, the latest version of our robot with a new layered drying adhesive.

Here is the actual robot.

And here is its content.

And if you look closely, you can see that they use toe peelers just like geckos.

If you could show me a portion of the video, you'd see it climbing walls.

(Applause) Yes.

And now, thanks to a new adhesive that a group at Stanford University has successfully designed, this amazing robot can stick to other surfaces as well.

(Applause.) Oh. One thing to point out is Stickybot.

I see something there. It doesn't just look like a gecko.

It has a tail. And this is what happens when you think you understand nature.

Engineers said that climbing robots would fall off walls if they didn't have tails.

So they asked us an important question.

They said, "Well, that looks like a tail."

I have a passive bar in there.

"Do animals use their tails to climb walls?"

What they were doing was giving back by testing hypotheses in biology that we would never have thought of.

So of course we, actually biologists, panicked, but you should have known that already.

We said, "So what does the tail do?"

For example, we know that fat is stored in the tail.

We know we can grab things with them.

And perhaps best known for providing static balance.

(Laughs) It also works as a counterbalance.

So look at this kangaroo.

can you see that tail? can't believe it!

Marc Leibert created the Uniroo hopping robot.

And without a tail, it was unstable.

Most tails now limit mobility, like this human in this dinosaur suit.

(Laughter) A colleague of mine has actually tested this limit, having a student with a high moment of inertia, a tail, run through an obstacle course, and as you can imagine, found that performance degraded.

(Laughter) But of course, this is a passive tail.

It can also have an active tail.

And when I went back to research this, I found that one of the great TED moments of the past was Nathan talking about active tails.

VIDEO: Mirvold believes the tail-whining dinosaur was interested in love, not war.

Robert Full: He said the tail was the whip for communication.

It can also be used for defense.

Quite powerful.

So we went back and observed the animal.

and ran it to the surface.

But this time what we did is put a yellow visible slippery patch there.

And look on the right side what the animal does with its tail when it slides. This is 10x slower.

So normal speed here.

And watch it glide and see what the tail does.

Equipped with an active tail that acts as a fifth leg, contributing to stability.

When I slid a lot, there was such a discovery.

I can't believe this.

The engineers came up with some really good ideas.

And of course I thought they might have active tails, but let's imagine them.

They are climbing walls and trees.

And let's say they reach the top and there are some leaves there.

And what if they climb under that leaf and the wind blows or we shake the leaf?

And as you can see here, we did that experiment.

(Applause.) And here's what we discovered.

It's real time now. I can't see anything.

But that's where it slows down.

What we discovered was the world's fastest air return response.

For those who remember the physics, this is a zero angular momentum righting response. But it looks like a cat.

A cat is falling. cats do this they twist their bodies.

But geckos do better.

And they do it with their tails.

So they do it while wielding this active tail.

And they always land in a Superman skydiving posture.

Well, if we're right, we figured we should be able to test this with physical models and robots.

So for TED we actually built a robot with a tail, a prototype.

And we plan to use the robot to try the first air return reaction on the tail.

when the light is turned on.

Well, that's it.

and show me the video.

there it is.

And it works just like it does for animals.

Therefore, all you need to do is wag your tail to correct your posture.

(Applause) Now, of course, this animal doesn't have a glide adaptation, so it's normally scary, but I thought, "Oh, okay, let's put it in a vertical wind tunnel."

Let's blow some air and give it a landing target of a tree trunk just outside the plexiglass enclosure and see what it does.

(Laughter) So we did. And here is its content.

The wind is blowing from below. This is 10x slower.

Glide in equilibrium. Highly controlled.

This is a little unbelievable. But when you actually take a picture of it, it's really beautiful.

And what's even better is that you can maneuver in the air, only inside the slide.

The trick is to grab the tail and swing it in one direction to yaw left and swing it in the other direction to yaw right.

So you can steer like this.

And it took me a lot of filming to believe this, but I do this as well. look at this.

It swings its tail up and down like a dolphin.

You can actually swim in the air.

But keep an eye on the front legs. Do you know what they are doing?

What does the origin of flapping flight mean?

It probably evolved to climb out of trees and try to control gliding.

stay tuned.

(Laughter) So we thought, 'Can they actually fly with this?

That is, we have a landing target. With these capabilities, can they go in that direction? Here we are in the wind tunnel.

And it sure looks like it.

It looks even better from the top down.

Please observe the animals.

We are definitely heading towards the landing target.

Notice how the tail behaves like a whip. Look at that

can't believe it.

We are really confused right now as there have been no reports of any gliding.

So we thought, 'Oh my gosh, we've got to go out there and see if this actually happens.'

Of course, the complete opposite of how you see it in nature movies.

I wondered, "Will it really glide in nature?"

Well, we went to forests in Singapore and Southeast Asia.

The video you see below is the first time we've seen this.

This is a real video of animals gliding. This is an actual research video, not staged. It has a red trail line.

Look at the end and see the animals.

But when it gets close to the tree, take a close-up look. And see if you can see it landing.

There it comes down. There is a gecko at the end of the trajectory.

do you see it there? there? Watch it fall.

Now look up there and you'll see the landing. Did you see it hit?

It actually uses a tail as well, just like we saw in the lab.

So we can continue this reciprocity by suggesting that they can be actively trailed.

And this is Boston Dynamics' first robot with an active tail.

In conclusion, I believe we need to build a bioreciprocity that will, as I have shown, increase the pace of fundamental discovery in applications.

But for this to happen, education needs to be radically redesigned, balancing depth and cross-disciplinary communication, and clearly training people how to contribute to and benefit from other fields.

And of course you need an organism and an environment to do that.

So whether we care about safety, search and rescue, or health, we must preserve nature's design. Otherwise, these secrets will be lost forever.

And from what I've heard from our new president, I'm very optimistic. thank you.

(applause)

Why do so many people succeed and then fail?

One big reason is that we believe that success is a one-way street.

So we do everything that leads to success, but then we get there. We assume we're successful, sit in our comfort zone, and stop doing all the things that actually made us successful.

And it doesn't take long to go downhill.

And I can say that this happens because it happened to me.

I worked hard and pushed myself to be successful.

But I stopped because I was like, 'Oh, I know, I made it.

You can just sit back and relax. ”

To be successful, I always tried to improve and do a good job.

But I stopped because I thought, "Enough is enough."

No further improvement needed. ”

Being successful, I was good at coming up with good ideas.

Because I did all the simple things that lead to ideas.

But then I quit. Because I thought I was this hot guy and I didn't have to think of an idea, it should just magically come to me.

And all that came was the creative block.

I couldn't come up with any ideas.

To be successful, I always focused on the client and the project and ignored the money. Then all this money started pouring in.

And I was distracted by it.

Then, when I was supposed to be talking to a client, I was suddenly on the phone with a stockbroker and a real estate agent.

And with my success, I've always done what I love.

But then I started doing things I didn't really like, like management. I'm the worst manager in the world, but I'm the president of the company after all, so I thought I should.

Well, soon a black cloud formed over my head, and here I was, superficially very successful, but internally very depressed.

But I'm a man. i knew how to fix it.

I bought a fast car.

(Laughter) It didn't help.

I was faster, but I was just as depressed.

So I went to the doctor. I said, "Doctor, I can buy whatever I want, but I'm not happy. I'm depressed."

They were true, but I didn't believe it until it happened to me.

But money can't buy happiness. ”

He said, "No, but you can buy Prozac."

And he put me on antidepressants.

Well, the black clouds faded a little, but I was just drifting, so all the work faded too. I didn't mind at all when a customer called me.

(Laughter) And the client didn't call.

(Laughter) They knew I wasn't serving them anymore, so I was just serving myself.

So they gave their money and their project to others who could serve them better.

Well, it didn't take long for the business to drop like stone.

My partner and I, Tom, had to lay off all of our employees.

It was just the two of us and we almost sank.

And it was great.

Because there were no employees, there was no one for me to manage.

So I went back to my favorite project.

I had fun again, worked harder and, in short, did everything that made me successful.

But it wasn't a quick trip.

It took 7 years.

But in the end, the business grew bigger than ever.

And when I returned to following these eight principles, the black cloud over my head disappeared completely.

And then one day I woke up and said, "I don't need Prozac anymore."

I threw it away and no longer needed it.

I have learned that success is not a one-way street.

It doesn't look like this. It's actually more similar.

It's an ongoing journey.

And if you want to avoid the "success-to-failure syndrome," just keep following these eight principles. Because that's not only how you achieve success, but how you maintain it.

I wish you all the best in your future endeavors.

thank you very much.

(applause)

I have had the unique pleasure of living in two biospheres.

Of course, all of us in this room live in Biosphere 1.

I've also lived in Biosphere 2.

And the cool thing is that you can compare biospheres.

And I hope you can learn something from it.

So what have I learned? Well, I'm making pizza in Biosphere 2.

Harvesting wheat to make dough.

And of course you have to milk the goats and feed them to make cheese.

It took Biosphere 2 four months to make a pizza.

Here in Biosphere 1, it takes about two minutes to pick up the phone and call "Can you deliver a pizza?"

So Biosphere 2 was essentially a 3-acre, fully enclosed miniature world that I lived in for 2 years and 20 minutes.

(Laughter) The top was sealed with steel and glass, and the bottom was sealed with a steel pan, essentially completely sealed.

So we had our own miniature rainforest, private beach with reef.

There were savannas, marshes and deserts.

We had a half acre farm to ourselves and had to grow everything there.

And, of course, we had human habitats—where we lived.

Back in the mid-'80s, when we were designing Biosphere 2, we had to ask ourselves some pretty basic questions.

So, what is the biosphere?

Back then, yes, we all know now that it was essentially the biosphere around the Earth, right?

Well, if you build it, you have to be a little more specific than that.

So we determined that it was in fact physically completely closed, that is, nothing entered or exited, nothing was physically present, it was energetically open, and that it was essentially the Earth.

This is a chamber 1/400 the size of Biosphere 2 called the Test Module.

And the very day this man, John Allen, went in there to spend a few days with all the plants, animals, and bacteria we put in to keep him alive, the doctors were incredibly worried that he was going to die of some horrible toxin, or that his lungs would clog up with bacteria or something, fungus.

But of course that didn't happen.

And in the years that followed, there were some great stories about the design of Biosphere 2.

But by 1991, we were finally able to build it.

And now it's time for us to try it for real.

We needed to know, can life be this flexible?

Can we squeeze this planetary-scale evolved biosphere into a tiny bottle and survive?

Big question.

And we wanted to know this because we could go somewhere else in space. For example, if we were to go to Mars, would we take the biosphere with us to live there?

I also wanted to know more about the planet we all live on.

Well, it's 1991 and it's finally time for us to try this baby.

Let's go on our maiden voyage.

Will it work? Or will something happen that we cannot comprehend and resolve, thereby negating the concept of an artificial biosphere?

So we entered with a total of 8 people, 4 men and 4 women.

More on that later.

(Laughter) And this is the world we lived in.

At the top there is a beautiful rainforest and ocean, and below that resides all the pumps, valves, water tanks, air conditioners, etc. called the technosphere.

One of the Biosphereians called it "The Garden of Eden on an Aircraft Carrier".

Of course, there were all the human settlements, laboratories, etc.

This is agriculture.

It was essentially an organic farm.

The day I stepped into Biosphere 2, for the first time, I was breathing a completely different vibe than the rest of the world, save seven others.

In that moment, I became part of that biosphere.

I don't mean that in an abstract sense. I literally mean it.

As I exhaled, the carbon dioxide nourished the sweet potatoes I was growing.

And we ate a lot of sweet potatoes.

(Laughter) And that sweet potato became a part of me.

In fact, I ate so many sweet potatoes that they turned orange.

I was literally eating the same carbon over and over again.

I was eating myself in some strange way.

But when it came to our atmosphere, it wasn't so much of a joke in the long run. Because it turns out that we are losing oxygen, a significant amount of it.

And we knew we were losing CO2.

So we were working on sequestering carbon.

Your Excellency, we already know the word.

We were growing plants like crazy.

We were harvesting their biomass, storing it in basements, growing plants, walking around, trying to remove all the carbon from the atmosphere.

We were trying to stop carbon from being released into the atmosphere.

We stopped irrigating the soil as much as possible.

We stopped farming to prevent greenhouse gases from being released into the atmosphere.

However, this was totally unexpected as the decrease in oxygen was faster than the increase in carbon dioxide and we had seen them go side by side in the test module.

It was like playing atomic hide and seek.

We lost 7 tons of oxygen.

And I had no idea where it was.

And I tell you, when you lose a lot of oxygen, and when our oxygen is considerably reduced. It dropped from 21 percent to 14.2 percent. Don't you think it's terrible?

So we were dragging the biosphere around.

And at night I had sleep apnea.

You will wake up gasping for breath because your blood chemistry is changing.

And you literally do it. You hold your breath and you -- (gasps) -- breathe in and it wakes you up. And it's so frustrating.

And everyone outside thought we were going to die.

In other words, the media reported them as if they were dead.

And I had to call my mother every other day and say, 'No, Mom, I'm fine, I'm fine.

we are not dead we are fine we are fine "

And the doctors were actually checking us out to make sure we were really fine.

But in fact he was the most susceptible to oxygen.

Then one day he couldn't put the numbers in order.

Then it was time to inject oxygen.

And you might think, "Oh my gosh, the life support was going down. Isn't that scary?"

yes. It was scary in a way.

Except I knew I could always walk out the airlock door if things got really bad, but who would say "I can't take it anymore!"?

Not me, that was for sure.

But it was also the scientific treasure of the project. Because as a scientific tool, we can actually move this baby around and see if we can actually find out where those seven tons of oxygen went.

And we really found it.

And I found it in the concrete.

Essentially, I was doing something very simple.

We were putting too much carbon into the soil in the form of compost.

it broke. It deprived the air of oxygen. Releases CO2 into the air. and went into the concrete.

It's really very easy.

So at the end of the two years we started our research, we were overjoyed. Because, in fact, you might say we've discovered something that we think is pretty ugly, it's a very bad failure when the oxygen is depleted and the life support system essentially fails.

Except we knew what it was. And we knew how to fix it.

And nothing else was more serious.

And we have more or less proven the concept.

People, on the other hand, were another subject.

We're—well, I don't know if we were repairable.

I can tell you that we have all gone pretty nuts.

And the day I came out of Biosphere 2, I was excited to see all my family and friends.

For two years I have seen people through glass.

And everyone ran up to me.

And I flinched. odor!

People stink!

It smells of all kinds, including hairspray and underarm deodorant.

Well, there was something in the biosphere to keep us clean, but nothing perfumed.

Besides, it will stink here.

Not only that, I lost track of where my food came from.

I grew all my food myself.

I had no idea what was in my food or where it came from.

I couldn't even recognize half the names of most of the foods I was eating.

In fact, I would stand in the store aisles for hours reading the names of everything.

People must have thought I was crazy.

It was truly amazing.

And I gradually lost my place in this great biosphere, in this great biosphere that we all live in.

In Biosphere 2, I fully realized that I have a huge impact on my biosphere every day, and that it affects me very intuitively and literally.

So I went about my business. Paragon Space Development Corporation is a small company that I started with people while I was in Biosphere. Because I had nothing else to do.

And one of the things we've done is try to understand how small these biospheres can be and what we can do with them.

So we sent it to the Mir space station.

We spent 16 months with one on the Shuttle and one on the International Space Station, successfully producing the first organism to complete multiple life cycles in space. This really pushed the limits of our understanding of how malleable our life systems can be.

We are also pleased to announce that a sneak preview is now available. On Friday, we will announce that we are actually forming a team to develop a system for growing plants on the moon. This is going to be a lot of fun.

And that legacy is the system we were designing. It is a fully enclosed system for growing plants on Mars.

Part of that was the need to model the very rapid circulation of CO2, oxygen and water through this plant system.

That modeling resulted in me going to Eritrea, the Horn of Africa, and all over the place.

Eritrea, once part of Ethiopia, is one of those stunningly beautiful and incredibly desolate places where I have no idea how people make a living there.

Very dry.

Here is what i saw.

But this is what I saw too.

I saw companies that harvested seawater and sand grow certain crops that grow in pure brine without any treatment.

And it will produce food crops.

In this case it was oilseeds.

It was amazing. They also produced mangroves on their plantations.

And the mangroves provided the animals with wood, honey, leaves, allowing them to produce milk and so on, just like we do in the biosphere.

And all of it was coming from a shrimp farm.

Frankly, from an environmental point of view, shrimp farms are a disaster for the planet.

They pour tons of pollutants into the ocean.

They also pollute their neighbors.

I mean, they're literally shitting each other's ponds.

And what this project was doing was taking these wastewaters and turning them into all this food.

They were literally turning pollution into wealth for the people of the desert.

In a way, they created an industrial ecosystem.

I was there because I was actually modeling the mangrove part of the carbon credit program under the United Nations.

Kyoto Protocol regime.

When I was modeling this mangrove swamp, I was thinking: "How are we going to put the boxes around here?"

Literally when you're modeling plants in a box, you know where to draw the boundaries.

I don't know at all in such a mangrove forest.

Of course, we have to draw boundaries across the globe.

And understand how it interacts with the planet as a whole.

And put the project in that context.

Today, around the world, we are witnessing an incredible shift from the so-called biocidal species, those whose systems have often been designed to kill life, whether intentionally or unintentionally.

In fact, this beautiful photo is above the Amazon.

And the light green here is the area where large-scale deforestation is taking place.

And those beautiful wispy clouds are actually fire—man-made fire.

We are now in the process of transitioning to what I call a biophilic society, a society that learns to nurture society.

It may not seem so now, but we are.

It's happening all over the world, in all walks of life, in every conceivable kind of career and industry.

And I think people often get lost in that.

They say, "But how can I find my way in it?

That's a very big subject. ”

And I say small things matter. I really do.

This is my backyard rake story.

This was my backyard in the very early days when I bought the property.

And in Arizona, of course everyone lays gravel.

And they like to keep everything beautifully collected. And they keep all the leaves away.

And Sunday morning the neighbor's weeder comes out and I want to slow them down.

It's a kind of aesthetic.

We feel very uncomfortable with clutter.

and threw away the rake.

And I shed all the leaves from the trees on my property.

And over time, what was I doing essentially?

I made the topsoil.

So now all the birds come. And I have a falcon.

And I have an oasis.

This is what happens every spring. For 6 weeks, 6-8 weeks, I have this green oasis flush.

This is actually in a riverside area.

And all of Tucson could become like this if everyone revolted and threw away the pitchfork.

Small things matter.

The Industrial Revolution and Prometheus gave us the ability to light up the world.

It also gave us the ability to see the world from the outside.

We may not all be running away and have another biosphere to compare with this one right now.

But we can look at the world and try to understand where we are in that context and how we interact with it.

And if you've lost track of where you are in the biosphere, or perhaps you're having trouble connecting to where you are in the biosphere, I want to tell you to take a deep breath.

The yogis were right.

In fact, breathing literally connects us all.

Take a breath now.

And as you breathe, think about what you have in your breath.

There's probably carbon dioxide from the person sitting next to you.

Perhaps a little oxygen is provided by algae on a beach not far from here.

It also ties us together in time.

There may be carbon from dinosaurs in your breath.

It is possible that the carbon you are exhaling now will be in your great-grandchildren's breath.

thank you. (applause)

Centuries ago, the Incas developed elaborate armor that could withstand the blows of sharp spears and maces, protecting their warriors from even the most violent physical attacks.

These sturdy structures were not made of iron or steel, but of unexpectedly soft cotton.

These thickly woven, layered cotton quilts could distribute the energy of a blow over a large surface area, protecting a warrior without restricting mobility.

These seemingly contradictory characteristics of strength and flexibility, softness and durability have their roots in the almost invisible complex biology of cotton fibres.

These fibers begin life deep within the cotton flower, on the surface of the seed.

A single seed is covered with as many as 16,000 fibers that bulge from the seed surface like miniature water balloons.

Each cotton fiber, no matter how large, is made up of just one cell.

The cell has multiple cell walls.

After a few days, the sides of the first layer, called the primary cell wall, harden, pushing cell growth in one direction and stretching the fibers.

Fibers are rapidly elongated for about 16 days.

Then the next stage begins - the strengthening of the cell wall.

This is achieved by making more of the carbohydrate cellulose.

Cellulose accounts for 34% of the cell wall at this stage and increases rapidly.

This new growth strengthens the cell wall against the existing wall particles.

Fortified walls become harder and restrict further growth.

In other words, if the fiber walls are rebuilt too quickly, the fibers will become shorter, ultimately resulting in a coarser, weaker fabric.

However, if cell wall strengthening is initiated too late, the cell walls will not be strong enough and the fibers will be too weak to hold the fabric together well.

Under ideal growing conditions such as proper temperature, water, fertilizer, pest control and light, cotton fibers are only 25 micrometers wide and grow up to 3.6 centimeters in length.

Long, thin fibers can wrap around each other better than short, not thin fibers. That is, long, thin fibers create strong threads that intertwine better as fabrics.

With these properties, cotton is used in a variety of applications, from soft fibers to 75% cotton US dollar bills.

The next critical stage in cotton fiber growth begins with thickening the secondary cell wall by depositing large amounts of cellulose in the secondary layer.

Cellulose accounts for more than 90% of the fiber weight.

The more cellulose deposited, the denser the secondary layer, which determines the strength of the final fiber.

This stage is essential for developing long-lasting materials such as T-shirts.

A garment's ability to withstand many years of washing and wearing is determined primarily by the density of its secondary cell walls.

On the other hand, its softness is strongly influenced by the fiber length established by the reconstruction of the primary wall layer.

Ultimately, the fibers are fully grown after about 50 days.

Life within the cell dies, leaving only cellulose.

The dry cottonseed pod, or cottonseed, that surrounds the fiber splits open, releasing thousands of fiber cells into a fluffy mass.

The filamentous fibers we see are finer than a human hair and are the remnants of dense, dry cellulosic walls.

Thousands of these fibers are spun into yarn to create everything from fabrics to coffee filters, diapers and fishing nets.

And with the help of modern science, as researchers study how to optimize cotton growth based on nutrients, weather conditions and genetics, cotton could soon be softer, stronger and more resilient than ever before.

Four years ago, one conversation with a teenage girl changed my life.

She was 13 and casually told me that she was a friend's little cousin and had met the man she was going to marry.

So I said, "Okay, tell me about him."

And she said his name was Harry Styles.

(Laughter) So I laughed a little bit as did you, and she said, 'I know you don't think you're serious, but I'm actually going to go with him.

Because I love him enough to slit a person's throat to be with him. ”

(laughs) That was the moment I fell in love with fangirls.

I didn't know it then, but that moment would change the course of my life and change everything I thought I knew about growing up, being a woman, and being truly happy.

But before we begin, what is a fangirl, what is Harry Styles?

According to the Merriam-Webster dictionary, a fangirl is "a girl or woman who is a very or overly enthusiastic fan of someone or something."

Strictly speaking, you can have fangirls about anything, but I was particularly interested in boy band fangirls.

That's because of their rather lethal reputation.

I remember my father telling me stories of Beatles fans in the 60s. Apparently they literally ripped a parked BMW to pieces. Because the band was supposed to be sitting in it.

In the 60s, the Beatles were the biggest boy band on the planet, but when I met this woman in 2015, the biggest boy band on the planet was none other than One Direction.

And Harry Styles was a member of One Direction.

Harry Styles had a reputation for his caring demeanor and flawless hair.

Read thousands of tweets about him and you'll see this.

I learned that he is a sweet cupcake.

I know he is a perfect angel.

On one occasion, he vomited on the side of a highway in California, and within two hours, fans had turned the site of the vomit into a sacred shrine.

(laughter) I scroll -- (laughter) fan-made drawings of Harry, pictures of his baby, pictures of his baby.

I'm watching a video showing how to make a DIY love totem for Harry. For example, a lampshade covered with a picture of Harry's face, or a key ring with his exact birth time.

I spent hours reading fanfiction and actually fell down this particular rabbit hole of stories that put me as the protagonist in various imaginary romances with him.

So one time I told him I was pregnant with his child.

In one scene, they meet each other in a hospital while fighting cancer, and in another scene, they fall in love so deeply that they become fugitives who kill people.

(Laughter) But then...

The unthinkable happens.

One Direction, the biggest boy band on the planet, loses a member.

Zayn Malik has left the band, and sentiment has exploded on the internet.

I read tweets describing how they were in physical pain from the loss, unable to eat, sleep or walk.

I read them explaining how big Zayn was to them.

And then watch a video of a 10-year-old girl crying.

But I really cry.

And then people repost these videos, but with new titles that include words like "crazy," "creepy," and "insane."

And then suddenly, on my YouTube sidebar, "Compilation: Fan reaction to Zayn's departure.

Psycho Alert! ”

Then I see the mainstream press pick up this story.

I read them describe these "young banshees".

I once read a journalist say, "It's been a well-known fact since the Beatles days that there's nothing scarier than a group of excited teenage girls."

(Laughter) And then I ask myself questions that I have never thought of in my life.

Why is it that young girls screaming and screaming for pop stars are seen as crazy, psycho, scary and a little over the top?

But is it normal at all to see boys screaming for football players with all their might?

Boys who cry at football, that's the love of the game.

Girls crying at Justin Bieber concert?

It's pathetic.

And as soon as I realized this double standard, I realized that all my fangirl curiosity was driven by the very same judgment.

I also suspected they were a little crazy.

I watched videos of the Beatles, the Backstreet Boys, and girls screaming for One Direction, and the word that came to mind was not "excitement" but "hysteria."

And what I didn't know was the history of the word.

In the 19th century, hysteria was considered a legitimate female mental illness and could be diagnosed by a doctor if a woman displayed excessive emotions or difficult behavior.

The word "hysteria" comes from the Latin word "hystericas" meaning "of the uterus", as the condition was thought to be caused by a malfunction of the uterus.

So the cure for hysteria was a hysterectomy.

This is what we still call a hysterectomy.

And at this point, I decided to redeclare my obsession.

Because I'm not just into fangirls anymore.

Now I'm obsessed with how the world talks about fangirls and how the world sees the enthusiasm of young women.

Because what I want to know is, if girls grow up in a world where words like “crazy,” “psycho,” and “hysterical” are casually used to describe female enthusiasm, how does that shape the way they see themselves?

And if girls grow up in a world where they're taught that they're designed to be a little bit crazier than boys, aren't they the same as being born less intelligent than men, less intelligent, less worthy of the same intellectual respect as their brothers?

Apart from that, I am obsessed with female screams.

Not in a creepy way.

I mean those shrieks and shrieks that fan girls make at concerts.

I would like to know why some people flinch just by explaining the sound, just thinking about it.

It was there that he met Amy Hume.

She is a voice coach.

And she blew my mind.

Because, she says, the female voice between the ages of 11 and 13 is one of the most interesting things to study.

why?

Because there's research by Carol Gilligan that says that's the age at which girls start acting and changing their voices.

For example, add a breath for maturity (mimicking vocal fry), or add vocal fry for indifference.

(Laughter) But tell me, according to this study, when do you think boys start acting and changing their voices?

Well, I guessed 18 because "men mature slowly".

error.

The answer was 4 years ago.

Because that's when boys learn not to cry or scream.

That they don't sound manly.

That's when I realized that the fan girl's shriek was like a supernatural power.

(Laughter) Because it's a fearlessly honest expression of pure celebration and joy, and it's a sound they haven't forgotten how to make.

In fact, I believe fan girls have a second superpower. Because they know how to do things that most of my adult friends don't know how to do.

Fangirls know how to love something without apology or fear.

My years of fangirl research have resulted in my determination to write something that celebrates and justifies them.

So I decided to make a thriller-comedy-musical that's like a Beyoncé concert, a rave, and a church.

I named it "Fangirls" and designed it like a Trojan horse.

I mean, it looks like you're making fun of these young women, but at the end of the day, they're secretly invading your mind.

(laughs) Thank you.

(Applause.) At some point -- thank you.

At one point a girl sings, "Why should I hide my feelings?"

Is it annoying?

Or is that not what boys do? ”

As a former fangirl cynic, that's the question I'd like to leave you guys with.

Why should fangirls soften it?

Is it because they're crazy?

Or is it because our definition of "reasonable" is based on what it's permissible for men to do?

What if we revisited the judgments we've been accustomed to making when we see young women screaming in excitement?

What if we decided to rethink the words we use to describe that joy, and not allow girls to be demeaned with words that undermine their intelligence, interests, and abilities?

Because, according to my research, they can build a shrine to Harry Styles' vomit on the side of the highway in less than two hours.

(Laughter) It takes management skills in logistics and communications.

(Laughter) I don't know what "competent" is if it's not "competent."

(Applause.) I think we can learn from them instead of criticizing them.

We could all die tomorrow, so why not try to love something while you have your breath?

So please try something with me.

May I have you all stand up?

Stand up if you can, stand up.

Well, now you know what's going to happen.

On the count of three, and when you're done, have all of you give your best fangirl shrieks.

(laughs) Is that so?

This is the reason why I ask you to do this.

Because if all 5,000 of you guys do this and get serious about it, we all get the first chance to hear it and decide it doesn't sound crazy.

It sounds hopeful.

So let's do this shall we?

I said, shall we do this?

(Audience: Yes!) Okay. OK, I'm going to cheat and I'm not going full volume. Because I'm on the mic and we don't want to hear it.

But that means you all have to give 110 percent effort.

do you prepare take a deep breath with me

Think of your loved ones and let's go, one, two, three.

(audience shouts) (laughter and applause) You all sounded just as amazingly sane, intelligent, and dignified as you entered this room.

(laughs) Thank you.

(applause)

I would like to talk about the changed media landscape and what that means for anyone with a message they want to send anywhere in the world.

And I would like to explain it by telling some stories about that change.

Start here. The presidential election was held in November last year.

You've probably read something about it in the newspapers.

There were also concerns that voter suppression would be implemented in some parts of the country.

So the plan arose to record the votes on video.

And the idea was that individual citizens with mobile phones capable of taking pictures and making videos would record their polling place, keeping an eye out for all kinds of vote suppression techniques, and upload this to a central location.

And this acts as a kind of civic observation, in which citizens participate not only to vote individually, but also to ensure the sanctity of the vote as a whole.

So this is a pattern that assumes we are all in this together.

What is important here is social capital, not technical capital.

These tools don't become socially interesting until they become technically boring.

It's not just a shiny new tool coming out and its uses starting to permeate society.

That's when everyone can take it for granted.

Because in an increasingly social media world, innovation can happen anywhere the idea of ​​people working together is for granted.

And we're starting to see media moving from one place to another, with innovation happening everywhere.

That's a big change.

I don't want to go into too much detail, but this moment we're living in, this moment in history's generation, is the moment of greatest expressiveness in human history.

This is a big claim. I'll try to back it up.

In the last 500 years, there have been only four times when the media changed enough to warrant a "revolution."

The first is the famous printing press. Movable type, permanent ink, this complex of innovations that began in the mid-1400s, enabled printing, and turned Europe upside down.

And then, hundreds of years ago, there was a revolution in two-way communication, conversational media, first with the telegraph and then with the telephone.

Slow text-based conversation, then real-time voice-based conversation.

Then, about 150 years ago, a revolution occurred in recording media other than print. First photographs, then recorded audio, and then movies were all encoded into physical objects.

And finally, about 100 years ago, we used the electromagnetic spectrum to transmit sounds and images over the air, such as radio and television.

This is the media landscape as we knew it in the 20th century.

This is what we of a certain age have grown up with and are accustomed to.

But there is a strange asymmetry here.

Media that are good at creating conversations are bad at creating groups.

And even media that are good at creating groups are bad at creating conversations.

If you want to have a conversation in this world, you have to have a conversation with someone else.

If addressed to a group, the same message will be delivered to everyone in the group, whether it's on the broadcast tower or the press.

That was the media situation in the 20th century.

And this is what changed.

This thing that looks like a peacock hit the windshield is Bill Cheswick's internet map.

He traces the edges of individual networks and colors them.

The Internet is the first medium ever to natively support groups and conversations simultaneously.

Phone calls yielded one-to-one patterns, television, radio, magazines, and books yielded one-to-many patterns, while the Internet yielded many-to-many patterns.

For the first time, the media are naturally good at supporting this kind of conversation.

That's one of the big changes.

The second big change is that as all media become digitized, the Internet will become a vehicle for all other media as well. This means that phones will go to the internet, magazines will go to the internet, and movies will go to the internet.

And that means all media are right next to all other media.

In other words, the media is becoming more and more a place of coordination rather than just a source of information. Because it allows groups of people who see or hear something to come together and talk to each other.

And the third big change is that the former audience, as Dan Gilmore puts it, can now be a producer as well as a consumer.

As new consumers join this media landscape, so do new producers. Because we can consume and produce using the same devices such as phones and computers.

It's like if you buy a book, they lend you a printing press for free. It's like having a phone that turns into a radio when you press the right button.

This is a major shift in the media landscape we are used to.

And it's not just about having the internet or not having the internet.

It's been almost 20 years since the Internet was in public use, but it's still changing as media becomes more social.

Even among the groups that know how to deal with the Internet, the patterns are still changing.

Second story.

Last May, a devastating 7.9-magnitude earthquake struck China's Sichuan province, causing widespread damage as indicated by the Richter scale.

And the earthquake was reported as it happened.

People were texting from their mobile phones. They were taking pictures of the building.

They had videotaped the building shaking.

They had uploaded it to QQ, China's largest internet service.

They tweeted it.

And the news was reported when the earthquake was happening.

And thanks to social connections, there were people all over the world listening to this news, such as Chinese students coming to other countries to attend school, and companies from other parts of the world opening offices in China.

The BBC got the first information about the earthquake in China from Twitter.

Twitter announced the existence of the quake minutes before the U.S. Geological Survey made it available for everyone to read online.

The last time there was an earthquake of this magnitude in China, it took me three months to admit it had happened.

(Laughter) They might have wanted to do that here rather than see these photos put online.

But they were not given that choice because their own people had beaten them so badly.

The government also learned about the earthquake from its own people, not from the Xinhua News Agency.

And this rippled like wildfire.

For a while, it showed the top 10 most-clicked links on Twitter, the global short-messaging service, and nine of the top 10 links were about earthquakes.

People collate information, tell people news sources, tell people the Geological Survey of the United States.

Tenth was a kitten on a treadmill, but that's the internet.

(Laughter) But in the first few hours it was 9 out of 10.

Within half a day, a donation site was launched and donations flooded in from all over the world.

It was an amazing, global and coordinated response.

And the Chinese decided, during a period of media openness, that they were going to let this media go, and that they were going to let this citizen report run.

And then this happened.

In the Provence region of Sichuan province, we are beginning to understand that the reason why so many school buildings have collapsed is because, tragically, an earthquake occurred during school hours. We began to realize that the reason so many school buildings had collapsed was because corrupt officials had been bribed into building them to substandard standards.

And citizen journalists started covering it too. And then there were the incredible photos.

You may have seen it on the front page of the New York Times.

Local officials literally prostrated themselves in the street in front of the protesters to evict them.

In short, "We will do anything to appease you. Just don't protest in public."

But they are radicalized people. Because they lost everything for the next generation thanks to the one-child policy.

A person who witnesses the death of a child has nothing to lose.

And the protests continued.

And finally the Chinese repressed.

That was enough for citizen media.

So they started arresting protesters.

They started shutting down the media where the protests are happening.

China is perhaps the world's most successful internet censorship administrator, using what is widely referred to as China's Great Firewall.

China's Great Firewall is a set of observation points that assumes media is expertly crafted, enters primarily from the outside world, enters in relatively sparse chunks, and enters relatively slowly.

And with these four characteristics, it can be filtered when imported into the country.

However, like the Maginot Line, China's Great Firewall was misguided in this challenge, as none of these four factors were true in this environment.

The media was locally produced. It's made by an amateur.

It was produced quickly. And it was produced in such incredible abundance that there was no way to filter it as it seemed.

And now, after decades of successful web filtering, the Chinese government is now in a position to decide whether to allow or shut down entire services. Because the transformation to amateur media is too vast to be dealt with any other way.

And it's actually happening this week.

Just two days ago, on the occasion of the 20th anniversary of the Tiananmen Square crackdown, the government announced it would block access to Twitter. Because there was no other way to filter.

They had to close the spigot completely.

These changes don't just affect people who want to censor their messages.

And since this is a transformation of the entire ecosystem, not just a specific strategy, it also affects the people you want to send your message to.

A classic media problem from the 20th century is how an organization conveys the message it wants to reach a group of people dispersed at the edge of a network.

And this is the 20th century answer.

Group your messages together. Send the same message to everyone.

national message. Individuals covered.

The number of producers is relatively small.

There is not much competition as it is very expensive.

That's how it reaches people.

It's all over.

We are increasingly entering an environment where media is global, social, ubiquitous and cheap.

Most organizations looking to send messages to the outside world, distributed audiences, are now accustomed to this change.

The audience can retort.

And it's a little funny. But just like humans, you can get used to it after a while.

But what we're in the middle of right now isn't really crazy change.

Here are some really crazy changes. It's the fact that they're no longer cut off from each other, the fact that once-consumers are now producers, and the fact that viewers can have direct conversations with each other. Because there are far more amateurs than professionals, and the size of a network, or network complexity, is really the square of the number of participants, which means that as the network grows, it gets very large.

For the last decade or so, most of the media available to the public has been professionally produced.

Those days are over and will never come back.

The current green line is the source of free content and this will be my last story.

During President Obama's campaign, we've seen some of the most imaginative uses of social media.

And I don't mean the most imaginative use in politics. It means the most imaginative use ever.

And one of the things that Obama did, famously, is what the Obama campaign did, which is famous for launching MyBarackObama.com and myBO.com. And millions of people rushed to join us and try to figure out how they could help.

An incredible conversation took place there.

And about this time last year, President Obama announced that he was going to change the vote on FISA (Foreign Intelligence Surveillance Act).

In January, he said he would not sign a bill that would grant telecommunications immunity for warrantless spying on Americans.

By the summer, in the middle of the general election campaign, he said, "I thought more about this issue. I changed my mind.

I will vote for this bill. ”

And many of his own supporters on his own site were openly outraged.

It was Senator Obama that they created it. They later changed their name.

"Please understand FISA correctly."

Within days of its creation, this group became the fastest growing group on myBO.com. Within weeks of being created, it became the largest group.

President Obama had to issue a press release.

he had to reply.

And he was essentially saying, "I've looked into the matter.

I understand where you come from.

But all things considered, I will continue to vote as I will.

But I just wanted to get in touch with you and say that I understand you disagree with me, and I'm going to take my gripe on the matter. ”

This did not please anyone. But then something interesting happened in our conversation.

People in that group realized that Obama had never shut them down.

No one in the Obama campaign has ever tried to cover up the group, make it difficult to join, deny its existence, remove it, or remove it from the site.

They understood that their role on myBO.com was to recruit supporters, not to control them.

And that's kind of the discipline it takes to truly mature and take advantage of this medium.

The media as we knew them, the landscape of media that was conceptually familiar as well as easy to deal with the idea of ​​professionals broadcasting messages to amateurs, is becoming more and more distant.

In a world where media is global, social, ubiquitous and cheap, a media world in which former audiences are increasingly fully participating, media are creating less and less of a single message for personal consumption.

It is being done more and more as a way to create an environment for convening and supporting groups.

And the choice we face—whoever has a message we want to be heard anywhere in the world—is not whether it is the media environment in which we want to operate.

That's our media environment.

The question we all face now is, "How can we make the most of this medium?"

Even if it means changing the way things used to be. ”

thank you very much.

(applause)

There are trillions of cells moving through your blood vessels at any given moment, sometimes making one circuit throughout your body in as little as a minute.

The origin of these cells lies deep within the bone.

Bones may look solid, but they are actually very porous inside.

Large and small blood vessels enter through this hole.

And inside most of the large bones of the skeleton is a hollow core filled with soft bone marrow.

Bone marrow contains fat and other supporting tissues, the most important of which are blood stem cells.

These stem cells are constantly dividing.

They differentiate into red blood cells, white blood cells, and platelets, and can pump about hundreds of billions of new blood cells into circulation each day.

These new cells enter the bloodstream through tiny capillary holes in the bone marrow.

Through capillaries, it reaches larger blood vessels and exits the bone.

If you have a blood problem, it's more likely that the cause can be traced back to your bone marrow.

Blood cancers often begin with genetic mutations in stem cells.

Although stem cells themselves are not cancerous, these mutations can interfere with the process of differentiation, resulting in malignant blood cells.

Therefore, for patients with advanced blood cancers such as leukemia and lymphoma, the best chance of cure is often an allogeneic bone marrow transplant, which replaces the patient's bone marrow with that of a donor.

Here's how it works:

First, blood stem cells are extracted from a donor.

Most commonly, blood stem cells are filtered from a donor's bloodstream by circulating the blood through machines that separate the blood into its various components.

In other cases, bone marrow is extracted with a needle directly from the hip bone, the iliac crest.

Meanwhile, the recipient prepares for the transplant.

High-dose chemotherapy and radiation therapy destroys the patient's existing bone marrow, destroying both malignant cells and blood stem cells.

This also weakens the immune system, making it less likely to attack the transplanted cells.

Donor cells are then injected into the patient through a central line.

They initially circulate in the recipient's peripheral bloodstream, but are quickly transported back to the bone marrow by molecules on stem cells called chemokines that act as homing devices.

Over several weeks, they begin to multiply and produce new healthy blood cells.

A small population of blood stem cells can regenerate a whole body's worth of healthy bone marrow.

Bone marrow transplantation can also cause what is called graft-versus-tumor activity. In this case, new immune cells generated by the donated bone marrow are able to clear out cancer cells that the recipient's original immune system could not.

This phenomenon helps eradicate stubborn blood cancers.

However, bone marrow transplantation also carries risks such as graft-versus-host disease.

This happens when the immune system generated by the donor cells attacks the patient's organs.

This life-threatening condition occurs in about 30-50% of patients who receive donor cells from non-identical twins, especially when stem cells are obtained from blood rather than bone marrow.

To reduce the risk of graft-versus-host disease, patients may take immunosuppressants or have certain immune cells removed from the donated sample.

But even if the patient avoids graft-versus-host disease, the immune system may reject the donor cells.

Therefore, it is important to find the best possible match first.

Major regions of the genetic code determine how the immune system recognizes foreign cells.

If these regions are similar in the donor and recipient, the recipient's immune system is more likely to accept the donor cells.

Because these genes are inherited, the best match is often the sibling.

However, many patients who need a bone marrow transplant do not have a matching family.

Such patients rely on a donor registry of volunteers to donate bone marrow.

All that is required for enrollment is to take a cheek swab and test for genetic match.

And in many cases, donating blood itself is not much more complicated than donating blood.

This is a way to save someone's life using a completely renewable resource.

When the April sun rises over the firewood piles, something noble begins to stir in your heart.

This queen bee is one of thousands of queen bees that mate in late fall and hibernate for the winter.

Now she appears in the spring air and begins her reign.

Most of her sisters were not so lucky.

While hibernating in compost piles and underground burrows, many sleeping queen bees have been eaten by spiders.

Other queen bees emerged early as climate change brought warmer winters, but found no food available.

And some of the queen bees that survived the winter fell victim to spring threats such as carnivorous plants, birds and artificial pesticides.

Our Queen is the sole survivor of the old nest and must now become the founder of the new nest.

But let's start with breakfast.

The queen bee makes her way to a citrus forest full of beehives.

Bees are dangerous when provoked, but now they are paralyzed by the morning cold.

Their shaggy bodies are dripping with sugar water from previous feedings, and the resourceful queen bee licks them as a morning snack.

The newly revitalized queen bee searches for a safe nesting site.

Safe from rain, wind and intruders, this tree hollow is ideal.

She chews up the wood and plant fibers around her to create a paper-like pulp.

She then constructs about 50 breeding cells that form the beginning of the nest.

The queen bee lays fertilized eggs in each cell using the sperm stored since last fall, producing up to 12 fertilized eggs in 20 minutes.

Within a week, they hatch into female larvae.

But until then, the queen must expand her nest, lay her eggs, defend against intruders, and hunt small insects to feed her brood.

Luckily our Queen is well prepared.

Unlike bees, hornets can sting as many times as needed.

With such a busy schedule, the Queen has little time to feed herself.

Luckily, you don't have to.

If you feed the larvae an insect, they digest the worm and make a sweet substance that nourishes the mother.

By the end of July, these first larvae have grown into adults, ready to forage, build, and defend.

The queen bee now lays eggs all the time and is able to sustain her life on the booty of worker bees and their unfertilized eggs.

Each worker has a lifespan of about three weeks, but the queen's continuous spawning increases the number of workers.

In just one summer, the nest reaches the size of a basketball and supports thousands of worker ants.

With so many people needing to eat, the nearby gardens offer a real buffet.

As the herd descends, alarmed humans attempt to knock the herd down.

They sometimes fight back with pesticides that deliberately poison the wasps, unintentionally affecting a wide range of local wildlife.

But wasps are actually essential to this ecosystem.

Sitting at the top of the local invertebrate food chain, these insects keep spiders, mites, and centipedes in check.

Wasps are especially useful for farms and gardens because they prey on crop-eating insects.

They also pollinate fruits and vegetables and help winemakers by nibbling grapes to start fermentation.

The feast continues until autumn, when the founders change their policy.

She begins work on raising some of the eggs into a new generation of queen bees, while also laying unfertilized eggs that mature into fertile males called hema.

This new queen and male need more food.

But as the summer ends, their usual sources of information dry up, and foraging bees begin to take more aggressive risks.

Nest structure deteriorates in September.

Hungry hard workers stop cleaning the nest, and various scavengers invade.

Just when it seemed that the hive could no longer be maintained, the fertile queen bee and her drones left in large numbers.

As the days get colder, the workers starve and the Queen reaches the end of her life.

However, in the sky, a swarm of breeding bees successfully mate.

The males die quickly, but the newly fertilized queens are ready to find refuge for a long sleep.

And this firewood pile seems like the perfect place to spend the winter.

Lord Shiva, the primordial destroyer of evil, the slayer of demons, the guardian and the all-knowing observer of the universe, was testing his wife's patience.

Historically, the union of Shiva and Parvati has been glorious.

They maintained the balance of thought and action on which the well-being of the world depends.

Without Parvati as the agent of energy, growth and transformation on Earth, Shiva would be the lone observer and the world would remain static.

But together the two formed a divine union known as Ardhanarishvara. This sacred union brought fertility and connection to all living things.

For these reasons, Parvati was widely revered as the Mother of Nature and as an integral counterpart to Shiva's life-creative powers.

She oversaw the material comforts of mankind. and ensured that the inhabitants of the earth were physically, emotionally and spiritually connected to each other.

But there was a rift between these two formidable forces.

While Parvati meticulously maintained his routine, Shiva had begun to neglect his wife's important work and began to quarrel over his role in the universe.

He believed that Brahma, the creator of the world, conceived the material world purely for his own fantasies.

Therefore, all material things are mere distractions called maya, nothing but cosmic illusions.

For thousands of years, Parvati just purposely smiled when Shiva ignored what she had nurtured.

But his recent reprimand made her realize that she had to prove once and for all the importance of her work.

She flew out of the world and tapped half of the cosmic energy that kept the Earth spinning.

With her disappearance, a sudden, terrible, all-encompassing sense of lack plunged the world into an eerie silence.

Without Parvati, the land would become dry and barren.

The rivers dwindled and the crops withered in the fields.

Hunger fell upon mankind.

Parents struggled to comfort their starving children as their bellies rumbled.

Those who had nothing to eat no longer flocked to their heaps of rice, but cowered away from the darkening world.

In shock and awe, Lord Shiva also felt a deep emptiness left by his wife's absence.

Jesus, in spite of his supreme power, knew that he was not immune to nourishment, and that his longing was abysmal and intolerable.

As Shiva despaired of the devastated Earth, he realized that he could not ignore the material world so easily.

In her husband's inspiration, the compassionate Parvati could not stand by and watch her followers languish.

To walk among them and restore their health, she assumed the form of a new avatar, carrying a bowl of golden porridge and armed with a bejeweled ladle.

As word spread about this hopeful figure, she came to be worshiped as Annapurna, the goddess of food.

With the advent of Annapurna, the world has blossomed anew.

People gathered to rejoice and give thanks for the fertility and food.

Some believe that Annapurna first appeared in the sacred city of Kashi, or Place of Freedom, on the banks of the Ganges. So Annapurna opened the kitchen to feed people until they could not eat.

But her banquets weren't just for humans.

Humbled by the spectacle of earthly pleasures blooming around him, Lord Shiva himself approached the goddess with an empty bowl, begging for food and forgiveness.

For this reason, the Supreme God is sometimes depicted as a poor beggar at the mercy of Annapurna. She holds a gold bowl in her left hand and forms an abaya mudra with her right hand. This is a sign of safety and security.

With these symbols, this powerful avatar reveals that the material world is not an illusion.

Rather, it is the cycle of life that must be maintained, from mouth opening and rumbling to nourishment to earth equilibrium.

My journey to where I am today began in 1974.

I'm the one with the funny gloves.

I was 17 and was doing the Peace Walk.

But what I didn't know was that most of the people standing there with me were Moonies.

(Laughter.) And in less than a week, I came to believe that the Second Coming of Christ had happened, that it was Sun Myung Moon, and that I had been specially chosen and prepared to be a disciple of God.

Sounds cool, but my family wasn't that thrilled with this.

(laughter) And they did everything they could to get me out of there.

At that time, some kind of subway was in operation. Some of you may remember.

They were called deprogrammers.

And after a long time, about five years, my family de-programmed me.

And I became a deprogrammer.

I started working on the case.

And after about five years of doing this, I was arrested for kidnapping.

Most of the cases I handled were involuntary.

What happened was that the family had to somehow get their loved ones to safety.

And they took them to safety.

And we came home and talked to them, usually for a week or so.

So after this happened I decided it was a good time to turn my back on this job.

And about 20 years have passed.

But I had a burning question.

It was, "How did this happen to me?"

And what actually happened to my brain?

Because something happened.

So I decided to write a book as a memoir about these ten years of my life.

And near the end of writing that book, a documentary was released.

I was in Jonestown.

And it had a chilling effect on me.

These are the dead men of Jonestown.

About 900 people died that day, most of them by suicide.

Women poisoned their babies and watched them die with bubbles coming out of their mouths.

The top photo is a group of Moonies receiving the Savior's blessing.

Their companions were chosen for them.

The picture below is Hitler Youth.

This is the foot of a suicide bomber.

I had to admit I understood it, even though it was a huge backlash.

I understand why this happens.

I understand how the human brain, how the human mind gets to where it makes sense. In fact, when the brain works that way, it would be a mistake not to try to save the world through genocide.

So what is this? How does this work?

And I came to think that what happened to me was a viral memetic infection.

For those unfamiliar with memetics, a meme is defined as an idea that replicates in the human brain like a virus and travels from brain to brain. The way the virus works is that it can infect and do the most damage to people with weakened immune systems.

In 1974, I was young, naive, and quite lost in my own world.

I was really an idealist.

These simple ideas for complex questions are very appealing when you are emotionally vulnerable.

What happens is that the circular logic takes over.

"The moon is one with God.

God will solve all the problems in the world.

I have to humbly obey.

God will put an end to war and famine, so all I have wanted to do is to humbly obey.

After all, God [works through] the Messiah. he will solve everything. ”

Intrusion becomes impossible.

And the most dangerous part of this is creating 'us' and 'them', 'right' and 'wrong', 'good' and 'bad'.

And it enables everything, streamlines everything.

But the problem is, if you look at my Mooney-era brain, neuroscience has expanded by leaps and bounds, as Ray Kurzweil said yesterday. Science is expanding.

We are beginning to look inside the brain.

So if you looked at my brain, or a brain infected with a viral memetic infection like this, and compared it to someone in this room, or someone who uses critical thinking on a regular basis, I'm sure it would look very different.

And as strange as it sounds, it gives me hope.

What gives me hope is that we first admit that we have a problem.

But it's a human problem. It's a scientific question, so to speak.

It takes place in the human brain. There are no evil forces trying to get hold of us.

Therefore, I believe this can be resolved through research and education.

So the first step is to understand that together we can do this and that there is no 'us' or 'them'.

thank you very much. (applause)

Paleontology was a science for young children, focused on excavating dinosaurs in a "Jurassic Park" costume.

A skull pops out of the ground and is exposed to the public.

Other than clickbait, it has no known connection to coloring books or monster movies.

no ...

It's not paleontology at all.

Paleontology is nothing but the study of past life.

all past lives.

It involves fundamental questions such as “Who are we?”

And "how did you get here?" -- using the broadest possible definition of "us": life itself.

Dinosaurs, a type of bird, are just a small part of that.

(Laughter.) And yet they get the most media attention.

[An amazing variety of ancients, dinosaurs and paleontology] This is a very accurate meme. I didn't make this either.

This is so true.

Anyway, most of us paleontologists consider dinosaurs to be the gateway to drugs.

There are many more wonderful things in the fossil record, and we know a lot about them.

Take a short, dinosaur-free tour of the last 4 billion years.

(Laughter) First, genetic material.

Basically, the virus started making proteins and destroying the environment.

The earth has become infected with life.

Some of these new bacteria have learned how to feed on sunlight to produce oxygen, capture carbon from the air, and destroy the iron that other microbes feed on by turning it into rust.

This went on for billions of years.

Some bacteria consumed other bacteria, acquired the power to convert oxygen into energy, and became the precursors of animals and plants.

But the result was a climatic shock from heat to cold to cold, which turned the planet into a glaciated snowball.

The technical term for this era is "Snowball Earth".

(Laughter) 700 million years ago, 800 million years ago.

Anyway, the microbes banded together to create multicellular life.

600 million years ago, geometric colonies emerged that sucked up microbes in the water.

These were soon superseded by modern animal ancestors.

Cambrian explosion.

Lobster relatives grabbed and caught by the arm and ate other animals.

Wriggling clams in armor crawled on the sea floor, entered the sea floor, and created a new ecosystem.

Our tadpole-like ancestors flitted along ancient coastlines, while their gritting-toothed eel-like relatives swam over the ice cream cone corals of the first reefs, avoiding school bus-sized krakens and hungry sea scorpions.

Plant fungi landed on land.

But then the glacier came back and killed almost everything.

But mass extinctions present opportunities.

Jawless fish invaded the sea, attaching tips, protrusions, and finally fins.

Spiders, scorpions, snails and earthworms came ashore.

Somewhere around China, a fish developed jaws and its offspring drove jawless fish, sea scorpions and branching plankton to extinction.

Some of these fish had arm bones in their fins and seven to eight fingers per fin.

On land, the plant becomes a tree and either grows huge or spreads its spores only once and then dies.

But then the glacier rebounded and became the second largest mass extinction.

It was the age of strange fish and plated crinoids.

winged shark.

A shark with jaws like a buzzsaw.

A shark with fins covered with small teeth.

A shark crushing a tooth plate.

The first bony fish similar to modern angelfish and eels that I saw.

Wetlands grow and are home to 10-foot-long millipedes and giant dragonflies.

These spread across the supercontinent of Pangea, where they died out and produced coal, resulting in the Ice Age of 100 million years.

Finally, vertebrates permanently landed on land, giving rise to crocodile-like amphibians and saber-toothed protomammals.

But then volcanoes erupted across Siberia, nearly wiping out everything, making it the third-largest mass extinction.

(Laughs) The day my life almost died.

A lone tusked mammal survived and thrived, but was soon replaced by a galloping crocodile.

The sea is home to marine reptiles, giant rafts made of sea urchins and related species of squid, and ammonoids of all kinds and forms.

But then Pangea began to break apart, forming the sea of ​​lava that would one day become the Atlantic Ocean, spewing toxic gases into the atmosphere and becoming the fourth largest mass extinction.

(Laughter) Well, actually there are many more than these five. These are the big ones.

(Laughter) So eventually fish the size of whales emerged, and modern fish attacked corals and used the algae they captured to feed on the sun's rays and grow to gigantic size.

Crumble-toothed crabs, stingrays, and other fish emerged, crushing shells and sparking an arms race between predators and prey.

An explosion of marine biodiversity has occurred.

Mammals climbed trees, flew, and did many other seemingly modern things.

They were eating the first flowers pollinated by the first bees.

An environmental revolution took place on land and in the sea that led to the modern world.

Except that an asteroid hit Mexico, which caused a volcano in India on the other side of the globe, and everything almost died again.

(Laughter) But -- there's always a problem, but we're still here -- mammals were born out of the ashes, dwarfed under extreme heat, and then grown even bigger.

The North Pole had palm trees and snakes.

Predatory deer dogs frolicked along ancient rivers, and their relatives returned to the sea to become the first otter-like whales.

It's not hyenas or other types of carnivores that were chased away by giant long-necked rhinos.

At this point, everything looks familiar, but it really isn't.

The Ice Age began in Antarctica, forming the first permanent polar ice cap in 200 million years.

This dried out the rest of the world but allowed grasses, rodents and cats to emerge.

Somewhere in Africa, a monkey roamed a new savannah.

Oh, and there was also a giant saber-toothed tiger. I would like to touch on that.

(Laughter.) I mean, we know what happened before, and more has happened.

how?

why?

Paleontology is a thriving science at the intersection of multiple other disciplines and techniques.

There is no data as big as the fossil record, and we are mining every part of it.

We use CAT scans, isotopes, genomes, robots, mathematical simulations, all kinds of analysis.

Make the most of it all so you can understand the past and how evolution works.

It also makes it possible to predict the future.

What will happen after the next mass extinction?

What strange things will appear?

Will mammals become smaller again?

Do mammals also exist?

In summary, we learned a lot about dinosaurs.

But we still have a lot to learn from the other 99.9 percent of things that have ever existed.

And that's paleontology.

thank you.

(applause and cheers)

Food is design.

When it comes to designing a plate, it's design, but when it comes to designing a unit, it's even better and most fun.

[Small things. ] [Big idea. ] "Pasta" comes from Latin and means "paste".

It is the work of mixing water and powder to actually shape it.

Some cultures around the world use rice flour, while others use soy flour.

Durum wheat is often used in Italy.

Pasta has been around for centuries, but it really flourished during the Renaissance.

And it wasn't until the late 17th century that they began to be mass-produced.

When designing any kind of object, think about how it works.

Think the same about pasta.

Do you want ribbed or smooth?

Ribbed ones absorb the sauce better.

Do you want a circle or a square?

The mouthfeel is different.

There is a reason for everything.

In this amazing taxonomy of pasta varieties, there are many ways to classify, but one basic classification is fresh vs. dried pasta.

Dry pasta is always made with durum flour and water.

It could be fresh pasta, or it could be flour and eggs.

Imagine you have a piece of dough that you can mold to your liking.

I mean, it really drives you crazy, doesn't it?

Very fresh and dry, but also long and short.

And there is even more diversity within that family.

Let's talk about a really classic type of short pasta.

Penne -- Everyone knows it, right?

Because it is cut diagonally, it is perfect for entwining the sauce.

"Farfalle" means "butterfly", but what do we call it here, because it's like a bow tie pinched in the middle.

"Orecchiette" means "little ear" and is typical of Puglia and very delicious.

And "conquilla", which looks like a seashell, of course a seashell.

It's ribbed so the outside scoops up the sauce and the inside is smooth.

Pasta is certainly gorgeous, but it's not just the shape that matters, as the texture and how it hits the tongue is also important.

When you keep polishing one object over centuries, the bar is very high.

Many so-called great designers have tried to impose shapes on pasta and have failed miserably.

The great Philippe Starck tried mandalas.

Some parts of the pasta i.e. walls were very thick and others thin so when the pasta was boiled some parts were completely mushy and some were too crispy and undercooked.

Really wrong, but they weren't a Bologna woman, or a Neapolitan chef, or a grandmother's family who for centuries had been trying to improve the thin walls of pasta.

There is no way to trace pasta back to one designer, one inventor. That's the beauty of pasta.

it belongs to the people.

And come to think of it, this simple mixture of carbs and water is the scaffolding upon which to build an entire culture.

I am the luckiest man in the world.

I got to see the last killer smallpox case in the world.

I was in India last year and may have witnessed the last polio case in the world.

Nothing makes me feel more blessed and honored to work in such a program than to know that such horrific things no longer exist.

So I tell you -- (applause) So I'll show you some dirty pictures.

It's hard to watch, but we should look at it with optimism. Because the horror of these pictures is balanced by the exhilaration of knowing they no longer exist.

Before that, I would like to talk a little bit about my own journey.

My background is nothing like the traditional medical education you might expect.

When I was interning in San Francisco, I heard about a group of Native Americans who occupied Alcatraz. A Native American wanted to give birth on the island, but no other doctors were willing to help her deliver.

I went to Alcatraz and lived there for a few weeks.

she gave birth. I caught a baby I left the island I landed in San Francisco. And all the media wanted to talk to me because my three weeks on the island made me an expert on Indian affairs.

(Laughter) I ended up appearing on every TV show.

someone saw me on tv they called me. And they asked me if I wanted to be in the movie and play a young doctor to a bunch of rock and roll stars traveling by bus from San Francisco to England.

So I said, "Yes, I will," so I became a doctor in a really bad movie called "Medicine Ball Caravan."

(Laughter) Well, since the '60s, it's either been on the bus or off the bus. I was on a bus.

My wife, who is 37, and I boarded the bus.

We took a bus from San Francisco to London and then changed buses at the big pond.

Then we, like any other young doctor, took two more buses through Turkey, Iran, Afghanistan, over the Khyber Pass and into Pakistan.

This is us at Khyber pass, that's our bus.

I had a little trouble crossing the Khyber pass.

However, I ended up in India.

And like the rest of our generation, we ended up living in monasteries in the Himalayas.

(Laughter) It's like a residency program for people in medical school.

(Laughter.) And we learned from a sage, a guru named Karoli Baba. I was told to ditch my dress, put on a three-piece suit, join the United Nations as a diplomat, and work for the World Health Organization.

And he made the outrageous prophecy that smallpox would be eradicated, and that this was God's gift to mankind thanks to the hard work of dedicated scientists.

And the prophecy came true.

This girl was Rahima Banu and she was the last homicidal smallpox patient in the world.

And this document is a certificate signed by the World Commission, certifying that the world has eradicated the first disease in history.

The key to eradicating smallpox was early detection and early response.

Again, early detection and early response.

Can you say so?

Target audience: early detection, early response.

Larry Brilliant: Smallpox was the worst disease in history.

More people died than any war in history.

500 million people died in the last century.

You've already read about Larry Page.

Some people read very quickly.

(Laughter) Larry Page and Sergey Brin -- I have a certain affection and a newfound affinity with them -- two million people died of smallpox the year they were born.

We declared smallpox eradicated in 1980.

This is the most important slide I have ever seen in public health. For [the sovereigns who died of smallpox] show you that you are the richest and most powerful, and that you are the king and queen of the world, but that they have not protected you from smallpox death.

We can never doubt that we are all in this together.

But viewing smallpox from a sovereign's point of view is the wrong point of view.

We need to look at it from the perspective of a mother who is just watching and helplessly watching her child get this disease.

Day 1, Day 2, Day 3, Day 4, Day 5, Day 6.

You are a mother and you are observing your child and you see hardened pustules on the 6th day.

On day 7 they show the typical scar of a smallpox umbilical cord.

Day 8.

And Al Gore previously said that the world's most photographed and most printed image is of Earth.

But this was in 1974, and at that time it was the most widely printed photograph. Because we printed two billion copies of this picture and took it from hand to hand, door to door, showing people, asking if there was smallpox in the house. Because that was our surveillance system.

We didn't have Google, we didn't have web crawlers, we didn't have computers.

By day 9, you are horrified at the sight of this picture. I looked at this picture and said, "Thank God." For it is clear that this is only a case of smallpox, and I am sure that this child will live.

And by day 13, the lesions have crusted and the eyelids are swollen, but you can see that the child has no other secondary infections.

And by day 20, he'll be scarred for life, but he'll stay alive.

There are other types of smallpox that are not.

This is contagious smallpox, and there is no part of the body where you can put your finger in and it is not covered by lesions.

Flat smallpox killed 100% of those affected.

And hemorrhagic smallpox was the most brutal disease of pregnant women.

Killed maybe 50 women.

I've never seen anyone die from this other than pregnant women.

In 1967, the WHO launched an outrageous program to eradicate the disease.

Thirty-four countries were affected by smallpox that year.

By 1970, that number was reduced to 18 countries.

By 1974, it had been reduced to five countries.

That year, however, a smallpox epidemic broke out across India.

And India was where smallpox made its last stand.

In 1974, India's population was 600 million.

India has 21 linguistic states, which is like saying there are 21 different countries.

20 million people use the road at any given time, whether by bus, train or on foot. Half a million villages and 120 million households were unwilling to report smallpox in their own homes. Because he thought that smallpox was a visitation of God, Sitara Mata, Mother of Cooling, and it was wrong to bring strangers into the house when God was at home.

India wasn't the only country that had a smallpox god. The smallpox god was spreading all over the world.

So how did we eradicate smallpox? Mass vaccinations are ineffective.

Everyone in India could be vaccinated, but in a year's time there would be 21 million newborns, the equivalent of Canada's population at the time.

It doesn't make sense to just vaccinate everyone.

We had to find all the smallpox cases in the world at the same time and draw a circle of immunity around them.

And that's what we did.

In India alone, my 150,000 best friends and I went door to door across India with the same picture.

And in the process, I learned something very important.

With each house-to-house search, reports of smallpox spiked.

When we didn't search, we were under the illusion that the disease didn't exist.

When we searched, we were under the illusion that there were more diseases.

Early detection and early response were needed, so a monitoring system was needed.

So we searched and searched and found all the cases of smallpox in India.

There was a reward. Increased rewards.

We continued to increase our rewards.

And as a result of doing so, the number of reported cases worldwide has dropped to zero.

It was the largest operation in United Nations history until the Iraq War.

150,000 physicians from all over the world - physicians of every race, religion, culture and nation - fighting side by side, not against each other, but as brothers and sisters in the common cause of making the world a better place.

However, smallpox was the fourth disease to be eradicated.

Failed 3 other times.

Malaria, yellow fever and raspberries failed.

But we may soon see polio eradicated.

However, the key to polio eradication is early detection and early response.

This year may be the year we eradicate polio.

It would be the second worst disease in history.

And David Heyman watching this on the webcast, David, go on. Coming soon!

(Applause) I feel like Hank Aaron.

Let's cross another disease off the list of scary things to worry about.

I was just working on a polio program in India.

Four million people go door-to-door in the Polio Watch Program.

That's the surveillance system.

However, early detection and early response are necessary.

Blindness is the same.

The key to detecting blindness is conducting epidemiological studies to determine the cause of blindness so that corrective measures can be taken.

The Seba Foundation was founded by a group of smallpox eradication program graduates who climbed the tallest mountain, tasted the elixir of success in eradicating disease, and wanted to do it again.

Over the past 27 years, Seva's programs in 15 countries have restored sight to more than 2 million blind people.

Seva was started because we wanted to apply the lessons of surveillance and epidemiology to something that no one else was paying attention to as a public health problem: blindness, hitherto only thought of as a clinical disease.

Steve Jobs gave me that computer in 1980. It's Apple's number 12. It is still in Kathmandu and still works. We should get it and put it up for auction to make more money for Seva.

And we conducted the first-ever health survey in Nepal and the first-ever nationwide blindness survey with amazing results.

Instead of the fact that most blindness is caused by glaucoma and trachoma, we were surprised to learn that the cause of blindness is cataracts.

You can't cure or prevent something you don't know exists.

The TED package includes the DVD "Infinite Vision" about Dr. V and the Aravind Eye Hospital.

I hope you will take a look.

What started as the Seva project, Aravind is now the largest and best eye hospital in the world.

This year, that one hospital will restore sight to more than 300,000 people in Tamil Nadu, India.

(Applause) Bird flu.

I stand here as a representative of all terrible events. This could be the worst.

The key to preventing or mitigating pandemic avian influenza is early detection and rapid response.

If bird flu strikes within the next three years, there will be insufficient supplies of vaccines and antiviral drugs to combat bird flu.

WHO is gradually grasping the progress of the pandemic.

It is currently in Stage 3 of Pandemic Alert, with low human-to-human transmission but no sustained human-to-human transmission.

The moment WHO said we moved to Category 4, this would not be like Katrina.

Airplanes won't fly.

With no antivirals, no vaccines, and knowing that some of them might have a disease that could kill you, would you get on a plane and cough and sneeze with 250 people you don't know?

I surveyed the world's top epidemiologists in October.

I asked them – they are all fluologists, flu experts – and asked the question you want to ask them: How likely is it that you think a pandemic will happen?

How bad do you think it would be if that happened?

Fifteen percent said they believed a pandemic would occur within three years.

But far worse than that, 90% said they thought their children or grandchildren would be affected by the pandemic.

And they thought a billion people would get sick if a pandemic hit.

As many as 165 million people will die.

When the just-in-time inventory system and the tight elastic bands of globalization break, there will be a global recession and Great Depression, and a $1-3 trillion cost to the economy will be much worse than just 100 million deaths. Because more people will lose their jobs and health benefits, the impact is almost unimaginable.

And because travel is getting so much better, things are getting worse.

Let's simulate what a pandemic would look like.

So we know what we are talking about.

For example, let's assume that the first cases occurred in South Asia.

It goes pretty slowly at first.

You will get 2 or 3 separate positions.

Then secondary infections occur and the disease spreads from country to country so quickly that you don't know what hit you.

It will spread all over the world within 3 weeks.

Now, if we had an 'undo' button and we could go back and isolate it and catch the infection when it first started -- if we could catch it early, catch it early, respond early, put those viruses in jail one by one -- that's the only way to deal with something like a pandemic.

And let me explain why.

I have a joke.

This is the epidemic curve, and I think medical personnel will eventually find out what it is.

But just kidding, epidemiologists like to reach the plague right here and run downhill to glory.

(Laughs) But normally you can't do that.

I usually arrive around here.

What we really want is to get here and stop the epidemic.

However, this is not always possible.

But there is an organization that has found a way to know when the first case will occur, and it's called GPHIN. It is the Global Public Health Information Network.

And in the simulation I showed you, you thought it was bird flu, but it was SARS.

And SARS is a pandemic that never happened.

And the reason it didn't happen is that GPHIN discovered the SARS pandemic three months before the WHO actually announced it, and thanks to that we were able to stop the SARS pandemic.

And I think we owe a great deal of gratitude to GPHIN and its founder, Ron St. John.

(Applause) Hello, Ron!

(Applause.) And TED flew Ron here from Ottawa, where GPHIN is. Because not only did the GPHIN detect SARS early, but you may have seen Iran announcing that it had bird flu in Iran last week, it wasn't February 14th that the GPHIN discovered bird flu in Iran, it was last September.

We need an early warning system to protect us from mankind's worst nightmare.

Therefore, my TED wish is based on the commonalities of these experiences.

Smallpox -- Early detection, early treatment.

Blindness, polio -- early detection, early treatment.

Pandemic bird flu -- early detection, early response.

It's a litany.

It is clear that the only way to combat these new diseases is to catch them early and kill them before they spread.

So my TED hope is that you will help build a global system to protect us from humanity's worst nightmare: an early warning system.

And I was going to call it "early detection", but it really should be called...

"Perfect Early Detection". [TED] (laughter) Huh?

(Applause.) But seriously, the idea was born at TED, and I'd like to make it a legacy of TED and call it the International System for Absolute Early Detection of Disease.

[INSTEDD] And INSTEDD will be our mantra.

So instead of a hidden bird flu pandemic, we find it and contain it quickly.

Instead of bioterrorism and bioerror, new viruses caused by shifts and drifts, we find and contain them.

Instead of industrial accidents like oil spills and the Bhopal catastrophe, we find them and respond to them.

Instead of a hunger that was hidden until it was too late, we will discover it and respond.

And instead of government-owned and hidden systems, let's build early detection systems that are freely available to everyone in the world, in their own language.

Be transparent, non-governmental, not owned by a single country or corporation, based in a neutral country, with redundant backups in different time zones and different continents.

Let's build it on GPHIN.

Increase the websites they crawl from 20,000 to 20 million.

Increase the languages ​​they crawl from 7 to 70 or more.

Use text message, SMS, or instant messaging to include a confirmation message to confirm to someone within 100 meters if the rumor is actually valid.

And let's add satellite confirmation.

And add Gapminder's awesome graphics to the front end.

And we grow it as a moral force in the world, discovering those horrible things before others know and sending our responses to them. Then, next year, instead of gathering here to lament how much terrible things are in the world, we'll be proud to unite and use the unique skills and magic of this community to stop pandemics and other catastrophes and do everything we can right now to change the world.

(Applause) Chris Anderson: Great presentation.

First of all, just to make you understand, are you saying that by writing a web crawler and looking for patterns on the internet, you can detect anything suspicious before the WHO can see it?

Give an example of how it can be true.

Larry Brilliant: Are you upset about copyright infringement?

CA: No, I love it.

(laughter) LB: Well, as Ron St. John -- I hope you'll go and talk to him at dinner later.

In 1997, when he started GPHIN, there was an epidemic of bird flu, H5N1.

It was Hong Kong.

And Hong Kong's best doctors responded quickly, slaughtering 1.5 million chickens and birds, halting the epidemic in its tracks.

Immediate detection, immediate response.

Years later, many rumors about bird flu have spread.

Ron and his team in Ottawa began crawling the web. I have crawled only 20,000 different websites, mostly periodicals, but have read and heard about the concerns of many children with high fevers and bird flu symptoms.

They reported this to WHO.

Since WHO is a United Nations, it only receives reports from governments, so it took some time to act.

But they were able to point to the WHO and let them know that there is an astonishing and unexplained cluster of illnesses similar to bird flu.

It turned out to be SARS.

This is how the world learned about SARS.

Thanks to that, we were able to stop SARS.

Now, what's really important is that before GPHIN existed, 100 percent of the reports of bad things in the world, whether they were talking about hunger, or bird flu, or Ebola, 100 percent of all those reports were from nations.

At the moment they in Ottawa cracked with an $800,000 annual budget, 75 percent of all reports worldwide came from GPHIN, and 25 percent of all reports worldwide came from all 180 other countries.

Now here's where it gets really interesting. What do you think happened to those countries after they were active for a few years?

I felt like they were pretty stupid.

And now that reporting rate has dropped to 50% as other countries have started reporting.

So can surfing the web catch diseases early?

Of course you can.

Of course you can.

Six weeks before we discovered SARS using an English web crawler, we found out that we discovered SARS using a Chinese web crawler.

Well, they speak only seven languages.

These vicious viruses aren't really going to appear first in English, Spanish or French.

(laughs) Well, I would like to take GPHIN and use it as a base.

We would like to add as many languages ​​as possible from around the world.

I would like to make this information available to everyone so that health officials in Nairobi and Patna, Bihar can access this information as well as people in Ottawa and CDC.

And we want to make it a part of our culture that there is a community of people who pay attention to mankind's worst nightmare, and that it is accessible to everyone.

When we talk about surgical robots, we also talk about surgery.

We've tried to keep the images from being too graphic, but keep in mind that surgeons have a different relationship to blood than normal people. Because what a surgeon does to a patient is a felony if done without consent.

Surgeons are what some might call the tailors, plumbers, carpenters, or butchers of the medical world. Cut, reshape, reform, circumvent, repair, and more.

However, the evolution of surgical instruments and surgical techniques should be discussed together.

So, to give you some perspective on where surgical robots are now and where they might go in the future, I'd like to give you a little perspective on how we got to this point and how we came to believe that surgery is OK, that this can be done, that this kind of amputation and reshaping is OK.

So let's take a little perspective, about 10,000 years from now.

This is a trephine processed skull.

And trephination is simply drilling a hole in the skull.

And skulls like this date back 5,000 to 10,000 years, with hundreds of skulls found in archaeological sites around the world.

5,000 to 10,000 years! Now imagine this.

You are a healer in a stone age village.

And then there's the man who doesn't really know what the problem is - Oliver Sacks will be born all the way in the future.

He has a seizure disorder. and you don't understand this.

But you think, ``I don't really know what's wrong with this guy.

But you might be able to fix it by punching a hole in his head. ”

(Laughter) Now, this is surgical thinking.

We are now at the dawn of interventional surgery.

The amazing thing about this is that we don't really know how much of this content was for religious purposes, how much was for therapeutic purposes, but what we can say is that these patients survived.

Judging by the healing of the borders of these holes, they lived days, months and years after the puncture.

And what we see is evidence of thousands of years of sophisticated technology passed down around the world.

This happened independently with sites everywhere not communicating with each other.

We are truly witnessing the dawn of interventional surgery.

Now you can fast-forward thousands of years to the Bronze Age and beyond.

And we are seeing new and sophisticated tools emerge.

But surgeons of these times are a little more conservative than their bold, piercing ancestors.

They limited surgery to fairly superficial injuries.

And the surgeon was a merchant, not a doctor.

This continued well into the Renaissance.

That might have saved writers, but not so much for surgeons.

They were still in disbelief.

Surgeons still had PR issues as they were dominated by itinerant barber surgeons.

They traveled from village to village, town to town, performing surgery as a form of performance art.

Since we live in an era without anesthesia, the suffering of patients is as much in the public eye as the surgery itself.

One of the most famous of these, Frere Jacques, is shown performing lithotripsy here. It was one of the most invasive surgeries they performed at the time, removing a bladder stone, and it took less than two minutes.

Dramatic staging required a great deal of flair and had to be really, really fast.

So here we see him doing lithotripsy.

And he is said to have performed more than 4,000 of these public surgeries while roaming Europe, a staggering number considering that surgery was supposed to be a last resort.

I mean, who would go through that?

You will not feel anything until the anesthesia is applied.

The demonstration of the Morton Ether Inhaler in the Massachusetts Legislature in 1847 ushered in a whole new era in surgery.

Anesthesia gave surgeons freedom to operate.

Anesthesia allowed them to experiment freely and dig deeper into the body.

This was truly a revolution in surgery.

However, there was a rather big problem with this.

Patients died after very long and painstaking surgeries to try to fix what was hitherto untouched.

They died from mass infection.

I no longer felt pain from the operation, but soon I would die.

And until the next major revolution in surgery, aseptic technology, the majority of surgical patients will continue to suffer from infections.

Joseph Lister was the greatest advocate of aepsis, or infertility, to a highly skeptical mass of surgeons.

But eventually they came back.

The Mayo brothers visited Lister in Europe.

And they went back to American clinics and said they learned that washing hands before surgery is just as important as washing them after surgery. (Laughter) It's very simple.

Nevertheless, intraoperative mortality was significantly reduced.

These surgeries have really started to pay off.

The patient's insensitivity to pain and the sterile nature of the surgical field made all bets off and limited.

Surgery can now begin anywhere: intestine, liver, heart, brain.

Transplantation: You can take an organ from one person and transplant it to another person and it works.

Surgeons no longer had a publicity problem. They had become gods.

The era of "big surgeons, big incisions" had arrived, but it cost a lot. It saves lives, but does not necessarily improve quality of life. Because healthy people usually do not need surgery, and unhealthy people have a very difficult time recovering from such cuts.

I had to ask the question, "So could the same surgery be done with a smaller incision?"

Laparoscopy involves this type of surgery, which involves using long instruments through small incisions.

And it changed the surgical landscape a lot.

Some tools for this have been around for 100 years, but until the 1980s they were only used as diagnostic techniques. Since then, camera technology has changed, and it has become possible to use it in actual operations.

Now, what you are seeing is the first surgical image. As we are down the tube, this is a new entry into the body.

It's very different from what I imagined.

Instruments can be inserted through two separate lateral incisions to begin manipulating the tissue.

Within a decade after the first gallbladder surgery was performed laparoscopically, the majority of gallbladder surgery was performed laparoscopically. This was truly a revolution.

But the revolution also had casualties.

Mastering these techniques was much more difficult than people expected.

The learning curve was very long.

And during that learning curve, the complexity got pretty high.

Surgeons had to give up 3D vision.

They had to give up their wrists.

They had to give up the intuitive movement of the instrument.

This surgeon has over 3,000 hours of laparoscopy experience.

Now, this is a particularly frustrating needle placement.

But this is difficult.

And one of the reasons it's so hard is because the external ergonomics are terrible.

I have a long instrument and practice off the center line.

And the equipment basically works in reverse.

So all you need to do is use your hand function to place it on the other side of that small incision, you need to put your wrist on that instrument.

So when it comes to robots, the da Vinci robot just put its wrist on the other side of the incision.

Now let's see how this wrist works.

And now, in contrast to laparoscopy, the needle can be precisely placed in the instrument, threaded all the way through, and the trajectory of the needle can be traced.

The reason this is so easy is because the hand moves and the instrument follows that motion exactly as you can see below.

Now, between these instruments and your hands is a large, rather complex robot.

Surgeons sit at the console and use these controllers to control the robot.

The robot then moves these devices and powers them internally.

It has a 3D camera so you get a 3D view.

Since the introduction of this robot in 1999, many robots have come out and been used for surgical procedures such as prostatectomy. Prostatectomy is an operation to remove the prostate located in the back of the pelvis, and fine anatomy and delicate manipulation are required to obtain a good surgical result.

A bypass vessel can also be sewn directly to the beating heart without breaking the chest.

All this is done between the ribs.

It can then go inside the heart itself and repair the valves from the inside.

You have these technologies -- thank you -- (Applause), and you might say, "Wow, this is really cool!"

So, smart pants, why aren't all surgeries done this way?"

And there are some reasons, some good reasons.

And cost is one of them.

We talked about big, complex robots.

One of these robots is packed with features and costs as much as a solid gold surgeon.

It's more convenient than a solid gold surgeon, but it still requires a fairly large capital investment.

However, once you get it, the procedure costs will be cheaper.

But there are other barriers as well.

So it's like a prostatectomy. The prostate is small and in one place, and the robot can be set very precisely to work in that one place.

So it's perfect for something like that.

And indeed, if you or someone you know has had a prostate removed in the last few years, chances are they have had their prostate removed using one of these systems.

However, if you need to reach multiple locations instead of just one, you will have to move your robot.

And you have to make some new incisions there.

And then you have to reconfigure.

You need to add more ports etc.

And the problem is that it's time consuming and cumbersome.

That's why there are so many surgeries that da Vinci didn't do.

So we had to ask, "How can we fix that?"

What if you could change it so you didn't have to re-set it up every time you moved to a different location?

What if you could have all your instruments in one place?

What changes will it make to the surgeon's performance?

And how would that change the patient experience?

Now, to do that, you need to be able to connect the camera and instruments through one small tube, like the one you saw in the laparoscopy video.

Or, not coincidentally, like a tube like this.

So coming out of that tube is the debut of this new technology, a new robot that can reach anywhere.

Ready? So here we come.

This is a camera and three devices.

And when you see it come out, it can't all stay clustered like this in order to actually be able to do anything useful.

It must be able to move off the centerline and then back towards it.

A cheeky little devil.

But what this does is it gives you a very important traction and reverse traction so you can dissect, you can suture, you can do all the things you need to do, all the surgical work.

But it all comes in through one incision.

It's not that simple.

But the freedom this gives you is worth it.

But it's transparent to the patient. This is all they see.

I can't wait to see where I can take this.

We can write the script for the next revolution in surgery.

As you take advantage of these features to get to the next place, you'll be able to decide what your new surgery will look like.

And I think to really accomplish the rest of that revolution, we need to not only move our hands in new ways, but look in new ways.

we need to look beyond the surface.

We need to be able to better guide what we are cutting out.

This is cancer surgery.

One of the problems with this problem, even for surgeons who observe it closely, is that you can't see the cancer, especially when it's hidden beneath the surface.

So we're starting to inject specially designed cancer-targeting markers into the bloodstream.

It binds to and migrates to cancer.

And you can make those markers glow.

And you can take a special camera and see it.

Now you know where you need to cut, even under the surface.

These markers can be obtained and injected into the tumor site.

And because we can track where the cancer is draining from the tumor site, we know where it might go first.

Because these dyes can be injected into the bloodstream, new blood vessels can be created to bypass blockages in the heart and to see if they actually connect before closing the patient again. This was previously not possible without radiation.

By lighting up a tumor like this kidney tumor, you can see exactly where the boundary between the kidney tumor and the kidney you want to keep, and between the liver tumor and the liver you want to keep.

And we don't even have to limit ourselves to this macro vision.

We have flexible microscope probes that can be introduced into the body.

And you can see the cells directly.

I'm looking at nerves here. So what you see below is a nerve, and above is a microscope probe held by a robotic hand.

So at the moment this is all very prototypical.

However, if you are a surgical patient, you will be concerned about your nerves.

This is because incontinence, bladder control, and sexual function can be maintained after surgery, all of which are generally of considerable importance to the patient.

So when you combine these technologies, you can reach and see everything.

we can cure the disease.

And then the patient can be left complete, intact and functional.

Now, I've been talking about patients as if they were some abstract person outside this room.

And it's not.

Perhaps many of you will, at some point, or already, be faced with a diagnosis of cancer, heart disease, or organ dysfunction, and see a surgeon.

And when you get to that point, I mean, these ailments don't care how many books you've written, how many companies you've started, whether you've won a Nobel Prize that you haven't won yet, how much time you're going to spend with your kids.

These diseases hit us all.

And what I propose to you is the possibility of a simpler operation...

Would that make the diagnosis less scary?

I don't even know if I really want to.

Because facing your own death, unlike anything else, you re-evaluate your priorities and realign what your life goals are.

And I never want to take that spark from you.

What I want instead is for you to be complete, intact, and functional enough to go out and save the world after you decide it needs to be saved.

That's my vision for your future.

thank you.

(applause)

You are probably familiar with FOMO.

[This person invented this word] It stands for "Fear Of Missing Out."

It's the feeling you get when someone else seems to be doing something better than what you're doing right now.

But there's another co-pilot you should be aware of, and it's far more dangerous.

It's called FOBO, which stands for "Fear Of a Better Option".

[How we work] We live in a world of overwhelming choices.

Even decisions that used to be simple, like choosing a restaurant or doing daily shopping, now involve overanalysis.

Technology only makes this problem more pronounced.

If you want to buy white shoelaces online, you have to sort through thousands of products and read hundreds of reviews.

The amount of information you have to process is staggering, even if you only buy a couple of strings cheaper than your morning latte.

You've probably experienced FOBO when you struggled to choose just one out of a group of perfectly acceptable outcomes.

This is a symptom of a culture that sees value in collecting and preserving as many options as possible.

You may wonder why it is so bad.

It seems counter-intuitive.

Isn't it a privilege to have so many good options to choose from?

The problem is that FOBO can cause severe analysis paralysis and negatively impact both your personal and professional life.

Valuable time and energy are wasted when decisions are not made with confidence.

Fortunately, there are ways to overcome FOBO.

Here is the secret.

Whatever decision you make, you must first decide on your stake. This will determine your decision-making strategy.

After all, there are only three kinds of decisions you actually face in life. There are only three: high-stakes decisions, high-stakes decisions, and no bets.

Let's start with the bet-free decision.

These are the little things in life, few answers are wrong, and hours later you won't even remember your decisions.

A good example of this is choosing what to watch on TV.

With thousands of shows, it's easy to get overwhelmed, but no matter what you choose, the results are basically non-existent.

So spending more than a little time on FOBO is a huge waste of energy.

All you have to do is move on.

When it comes to gambling-free decision making, the key is to outsource it to space.

For example, you can toss a coin with only two choices.

Alternatively, try my personal favorite. ask the clock

Assign each choice to a half of the clock and let the second hand tell you what to do.

It looks like you can eat fish.

So you are making a low-risk decision.

These come with consequences, none of which are earth-shattering, and many of which are acceptable.

Many routine workplace tasks, such as buying a printer, booking a hotel, or selecting a potential offsite location, are traditionally low-risk in nature.

It takes some thought, but it's not a game-or-deal consideration that you'll probably forget in a few weeks.

Here, decision-making can be outsourced, but it is risky and requires critical thinking.

I will entrust this to someone else.

Set some basic criteria, choose who makes recommendations, and accept their advice.

Avoid canvas temptations.

Your goal is to clear the dishes, not kick cans on the road.

We worked on low-risk and non-risk decisions, which gave us the space and time we needed to process high-stakes decisions.

"Which house should I buy?" or "Which job should I get?"

The risks are high and there are long-term consequences, and we absolutely want to do it right.

Before we get to work, let's establish some ground rules to guide the process.

First, think about what really matters to you and set your standards accordingly.

Then collect relevant facts.

Be sure to gather data on all your options so you can be confident that you are making a truly informed decision.

And third, remember that FOBO is inherently born when you struggle to pick just one out of a group of perfectly acceptable options.

So rest assured that whichever you choose, the downsides are limited.

Now that we have established some ground rules, we can begin the process.

It starts by identifying the frontrunner based on intuition, then directly compares each alternative to the frontrunner, one by one.

Each time, choose the better of the two based on criteria and discard the other.

Here are some tips to avoid FOBO:

Deleting an option removes it permanently.

If you keep returning to discarded options, you risk getting stuck.

Repeat this process until you have one final choice.

Following this system will ultimately be your own decision.

On the rare occasion that we get stuck, we end up delegating the final decision to a small group of people who are credible and qualified to provide guidance on this particular topic.

Participate in groups of 5 people or less, ideally an odd number so that tiebreakers are built in where necessary.

Now that you've made your selections, one final challenge remains.

You must commit.

I can't promise you'll ever really know if you made the perfect decision, but I can say this. A good portion of the world doesn't need to worry about FOBO at all.

Unlike billions of people who have few, if any, options because of war, poverty, or disease, you have plenty of opportunities to live decisively.

You may not get everything you want, but the mere fact of being able to make decisions is powerful.

In fact, it's a gift.

make most of it.

I was really annoyed when I was pregnant.

Do this particular prenatal test without eating deli meat.

Why did you make that choice? Why didn't you choose differently?

I felt like I was being asked to do something, but I was never given an answer as to why.

[How we work] In the modern world of parenting, sometimes it seems like you can't win.

When I go back to work, I spend less time with my children.

What if they don't get the attention they need to develop properly?

If I stayed home and gave up my source of income, would I look back on my decision and regret it?

There's so much conflicting advice out there about whether you should stay home or go back to work that it can be confusing and emotional trying to choose between them.

You love your children and you want what is best for them, but how do you decide what is best when everyone has a different opinion?

There are many variations of parents in the home, and I think more families should ask if it makes sense for a male partner to stay home.

But in fact, most of the discussion about stay-at-home moms today focuses specifically on women.

And it's usually women who say they feel that what they do during the day determines, on a deep level, what kind of mother they are and who they are.

That's a big burden you put on yourself as a parent.

Also, being stared at after telling someone if you're going back to work can erode your confidence.

Should I stay home or go back to work?

Sure, it's an emotional decision, but as economists, we've learned that we can use data to overcome emotional decisions and be confident that we're making the best decisions for our families.

Specifically, there are three main factors to consider before making a decision.

First, you need to think about how this decision will affect your family budget.

Let's put out some numbers.

Let's say your total household income is $100,000, and you and your partner each earn $50,000.

That means about $85,000 after tax will come home.

If you both work and your family pays $1,500 a month for childcare, your total disposable income would be $67,000 a year.

Have you been with me all this time?

If you choose to stay home, your family will have less income, but no childcare costs.

Disposable income is reduced in this scenario, but not as much as if childcare were not taken into account.

Things get even more complicated if childcare costs are high in your area.

A full-time nanny can make $40,000 to $50,000 a year, depending on where you live.

If that's the case in your neighborhood, the scenario I've outlined would be financially better off for one parent's income to disappear entirely, leaving the other parent at home.

Of course, this is only a short-term analysis.

Childcare fees may be cheaper while the child is in school, and income may increase afterwards, so we want to take that into account if possible.

Once you've done the math, you'll know what's possible, and you'll be able to make more informed choices and feel more confident.

Then it's time to discuss what is best for your child.

You might think this should be the core of your decision, but there really isn't a right answer.

Studies in Europe and the United States show that the decision to return to work or stay home does not actually determine a child's future success.

Studies have found that having both parents working full-time has a similar impact on a child's future test scores and income if one parent is working or not.

The most important thing is what kind of environment your child is in during their leisure time.

As long as they are engaged in rich activities. Whether you're home with them or not, they'll thrive if they read, practice their motor skills, and socialize with other kids.

The data is a little nuanced.

For example, studies show that when both parents work, children from poorer families are positively affected, while children from wealthier families are less positively affected.

Thus, depending on household composition, the impact on children may be slightly positive or slightly negative, but the overall effect is negligible.

I would like to take maternity leave as an exception here.

There is growing evidence that babies do better when mothers take maternity leave.

The early days of your relationship with your child can affect your child's development, so you should take paid leave if you have it. If you don't take paid time off, consider taking the first few months unpaid if your budget allows.

And finally, ask yourself. what do i want

This may seem simple, but it's the element that feels most taboo to explore.

In talking to parents, I have found that when women choose to stay home, they often feel obliged to say that they have made this choice for the optimal development of their children.

Of course, that could be part of the reason, but "this is the lifestyle I prefer" or "this works for my family" answers are perfectly acceptable.

The same goes for working mothers.

Suffice it to say, "I like my job, so I went back to it."

If you want to go back to work, that's great.

I am lucky to have a job that I love, and I have every right to keep it after becoming a parent.

Be honest with yourself about what you want.

If you can be frank about it, you will definitely be happier, and you will be the best parent you can be, and that's what matters, right?

There is no right or wrong in parenting.

The best decisions are the ones that make you and your family happiest.

What you decide next is up to you.

By recognizing that the choice of whether to stay home or not is just a choice, with many factors pushing us in different directions, we can let go of our guilt and enjoy what seems best for our family.

Ethic, Hedge, and Octavia stand at the edge of a bottomless ravine.

It's the only thing between them and the tower that houses the second of three powerful artifacts.

We have a few moments before the guards return.

If the hedge's fuel gauge is empty, you can't fly the Ethic, so your only option is to build a bridge.

Luckily, the pile of stones floating nearby is a bridge component called a hoverblock, invented by Octavia herself.

Activating the stakes with explosive energy will cause them to self-assemble and cross the ravine as Ethic walks across.

But of course there are also pitfalls.

Hover blocks are stable only if they are perfectly palindromic.

That is, they must form the same sequence when viewed from front to back.

Stacks start in random order, but are always palindromic if possible.

When the palindrome reaches a point where it is impossible, the bridge collapses and those on it fall into a ravine.

Let's look at an example.

This stack stabilizes itself.

First, the A block is held in place.

Next is B.

And eventually C will be between B.

But suppose there was another A.

First two A blocks are formed, then two B blocks, but the remaining C and A have nowhere to go and the whole thing collapses.

A Node of Power allows the Hedge to power a single stack of blocks.

What instructions could Ethic give Hedge so that it could efficiently find and power stable palindromic stacks?

Stop now and figure it out for yourself.

Examples of palindrome include ANNA, RACECAR, MADAM IM ADAM.

Counting the number of times a particular letter occurs within a palindrome reveals useful patterns.

Stop now and figure it out for yourself.

First, let's look at a naive solution to this problem.

A simple solution is a simple, unoptimized, brute-force approach, but it gets the job done.

A naive solution helps you analyze the problem and acts as a stepping stone to a better solution.

In this case, the simple solution is to approach a pile of blocks, try all the arrangements, read them in order and then back to see if one is a palindrome.

The problem with this approach is that it takes a huge amount of time.

If the hedge tried one combination every second, it would take 42 days to use up just 10 different blocks.

This is because the total time is a function of the number of blocks factorial.

There are over 3 million possible combinations in 10 blocks.

What this simple solution shows is that we need a faster way to determine whether a stack of blocks can form a palindrome.

First, it may be intuitively obvious that stacking all the different blocks will never form one.

why?

So when does a given sequence become a palindrome?

One way to understand it is to analyze some existing palindromes.

ANNA has two A's and two N's.

RACECAR has 2 R's, 2 A's, 2 C's and 1 E's.

And MADAM IM ADAM has 4 M's, 4 A's, 2 D's and 1 I's.

The pattern here is that most characters occur an even number of times, and at most 1 occurs only once.

is that so?

What if RACECAR had 3 E's instead of 1?

3 is fine, because you can still get a palindrome with a new E at the end.

But if you make it 3 E's and 3 C's, the last C has nowhere to go.

So the most generalized insight is that a character can appear at most an odd number of times, while the rest must be even.

Hedge can count the characters in each stack and organize them into a dictionary, which is a neat way to store information.

A loop is then run and you can count how many times the odd number occurs.

If the odd number of characters is less than 2, the stack can be palindromic.

This approach is much faster than the naive solution.

It takes linear time instead of factorial time.

Here the time increases in proportion to the number of blocks.

Then create a loop in which the hedges individually approach the mountain and stop when they find a good one. You are now ready to go.

What happens is that hedging is fast, but it takes too long because there are too many mountains.

too long.

Ethics and hedges are safe.

But Octavia is not so lucky.

Someone has activated a magical alarm in the Elemental Temple.

By the time you and the other monks arrive on the scene, you know that disaster is on your way.

Overnight, four young apprentices broke into the inner chambers of the temple and stole the sacred element crystals.

However, when the alarm went off, they panicked and swallowed the crystals they were carrying just before they were caught.

Not knowing how to control the crystal's immense power, it quickly transforms into an uncontrollable elemental spirit.

Impossibly, the old monk next to you has seen something similar happen before.

He explains: "You must identify who has eaten which crystal and place each in the appropriate containment field before transforming.

The elements force their masters: those who have eaten the crystals of earth and water must tell the truth, but those who have eaten fire and air must lie. ”

Young people are too afraid to confess their sins.

Rather, they start blaming each other.

“Rikku stole the water crystal!” Sumi blurts out.

Rikku interrupts angrily.

"It was Bella, she stole the Fire Crystal!" Jonah looks up in fear and shakes his head.

"I... don't know what happened, but Sumi doesn't have the Earth Crystal." So who ate which crystal?

Stop now and figure it out for yourself.

This cannot be circumvented. Trial and error will be required.

But that's not a bad thing.

If you guess wrong, you will eventually reach the point where your conclusions contradict each other.

That way you can be sure your first guess was wrong and work from there.

This is a technique called contradiction proof.

The trick is to strategically decide where to start guessing.

Some assumptions may not contradict without further assumptions.

We want to pick the one that creates the most constraints by itself and gives us the most information when it turns out to be right or wrong.

For example, let's take a look at Sumi's remarks.

Assuming she is telling the truth, both truth-tellers will be identified.

Rikku will have the water crystal and Sumi will have the earth because she is not lying.

So, as Rick says, Bella has the Fire Crystal.

But then Bella lied about Jonah having the Air Crystal.

Still, it's the only option left.

This is a contradiction and turns out that our initial assumption was wrong.

So we can go back to the beginning here, but with the added knowledge that Sumi is lying.

Being a liar, Sumi must have a fire or air crystal.

So it follows that neither was accepted because Jonah was telling the truth about her.

It means Bella was lying about him, so she must have either fire or air, too.

Since Sumi was lying, Rikku couldn't take the water crystal. Only Jonah can get it.

And since the two liars have already been identified, Rikku should have the Earth Crystal.

So Bella has Fire Crystal and Sumi has Air.

You've managed to get them all into the proper containment fields just as the crystal magic begins to manifest.

Compared to the difficult task of training these children to control their new powers and figuring out who has which crystal.

I was never one of those kids who knew exactly what they wanted to do as an adult.

Over the past 15 years of my career, I've been an English teacher, a lawyer, a video game creator, and now a toilet paper salesman selling millions of rolls of toilet paper a year.

[Our way of working] Life is about finding the intersection of what you really, really like and what you're really, really good at.

It looks easy, but it's actually not that easy to find.

After working briefly as an English teacher, I attended law school and eventually became an attorney at a large law firm here in New York City.

Like most Americans, I spent the next couple of years clinging to my job for the rest of my life, working really late at a job I thought might be for me but never really liked.

That's when I realized that it takes years, if not tens of thousands of hours, to really get good at something.

There really wasn't much time to waste.

This story is not for people who hate their boss or want to quit their job because it's been too long.

This is for those who are ready to make a terrifying leap into a whole new career.

So, here are some tips that I would like you to refer to when thinking about changing jobs, and some things I noticed in the process.

First, there are three things to think about before you're ready to move on.

First, professional life is about learning.

If you're not even interested in learning anymore, that's a big red flag that you may not have a future in that industry.

Second, changing jobs is often intuitive.

If you're constantly having sleepless nights, waking up staring at the ceiling and thinking, 'Oh, I can't live if I don't try to change this or actually find out,' trust your intuition.

It may be time for a career change.

Conversely, one of the reasons not to move on is short-term pain.

If you don't like your boss or people at work don't like you, that's actually never a good reason to change careers. Because when you change careers, you usually have to start at the bottom, and you'll probably end up in a lot of short-term pain, like a lack of pay or a lack of title.

Pain is inevitable in any job.

You are convinced that now is the time to make a career change.

So there are three things you should do immediately.

First, network, network, network.

No one can build a career without great mentors and a great support network.

Networking means getting all the great advice you can get.

Thanks to technology, new people can say, "I'm thinking of changing jobs.

Can I talk to you for just five minutes? ”

That passion, that hunger and ability to be a sponge really attracts great mentors and people who take the time to give good advice.

So go out and meet new people.

The second thing that needs to be done immediately is to strengthen our finances.

The reality is that when you change careers, especially if you're starting your own business, you'll start with lower titles, lower paying jobs, or even no pay.

Therefore, it is very important to take action and check your financial situation to reduce the pain of the transition.

For me personally, when I turned from lawyer to video game creator, I wanted to have at least 6-12 months of personal career in banking.

6 to 12 months may not be the right number for you, but be honest with yourself about what that number should be.

Three, if you're not ready to make the full jump at this point, start a side hustle.

A side hustle can be anything from volunteering with an organization in a new industry you want to enter to starting a business part-time on the weekends.

A free way to see if you really like something.

So maybe you are ready to take action or have already taken action.

Here are three things to think about right now.

The first, again, don't burn bridges.

It took years to build the bridge, so why burn it now?

The world is a very small place and especially with all these online platforms, believe me, you will meet these people again, and perhaps at the most inopportune time.

Second, take inventory of what you've learned in your career.

Perhaps many of them really apply to your new job or career, whether it's socializing with people, playing on teams, or hanging out with assholes.

All of these are universally applicable in practice.

No matter what industry you are in, there will always be people who hate you. No one is immune to it, everyone needs to figure it out and you probably already know how.

Finally, starting a new job can be nerve-wracking.

But don't worry, take a deep breath. Because this is what I want to say to you. Everyone around you is rooting for your success because you are now part of a new team and your success is their success.

Welcome to your new career.

I would like to share some ideas in a very short time about the secret power of time.

Video: OK, start the clock. 30 second studio.

Please be quiet. calm down.

Finally. End the sequence. take one

15 second studio.

10、9、8、7、6、5、4、3、2...

Philip Zimbardo: Let's take a look at the principals' conversation in The Temptation of Adam.

"Come on, Adam, don't be so wishful. Take a bite."

"Bite, Adam. Don't abandon Eve."

"I don't understand, folks.

I don't want to get into trouble. ”

"Okay. One bite. What?"

(Laughter) Life is a temptation. It's all about yielding, resisting, yes, no, now, later, impulsive, reflective, present and future focus.

Promised virtues fall prey to the passion of the moment.

Of the teenage girls who vowed to remain sexually abstinent and virgins until marriage—thanks to George Bush—a majority, 60 percent, succumbed to sexual temptation within a year.

And most of them did so without contraception.

That's all I promise.

Now try seducing a 4-year-old and giving him a treat.

I can eat one marshmallow now. But if you wait until the experimenter comes back, you might be able to do two things.

Of course, if you like marshmallows, it's worth the wait.

What happens is that two-thirds of children give in to temptation.

they can't wait Others will of course wait.

They resist temptation. they put the now behind.

My colleague at Stanford University, Walter Michelle, went back 14 years later and tried to discover what was different about those kids.

In many respects, there was a big difference between the children who resisted and those who gave in.

Children who resisted scored as high as 250 on the SAT.

That's amazing. It's like a collection of different IQ points.

They didn't get into much trouble. They were better students.

They were confident and determined. And the key for me today, and the key for you, is that they were focused on the future, not the present.

So what is the time perspective? I will talk about it today.

Time Perspective is the study of how individuals, all of us, divide the flow of human experience into time zones or time categories.

And you do it automatically and unconsciously.

They differ between cultures, nations, individuals, social classes, and levels of education.

And the problem is that they can become biased because you learn to overuse some of them and underuse others.

What determines the decisions you make?

You make decisions that form the basis of your actions.

For some people, the only thing that matters is the immediate situation, what other people are doing, and what they are feeling.

And those who make decisions in such a form, we will call them "present-oriented." Because their focus is now.

For others, it is currently irrelevant.

It's always "What is this situation I've been through in the past?"

As such, their decisions are based on past memories.

And we will call such people "past-oriented". Because they focus on what happened in the past.

For others it is neither the past nor the present, only the future.

Their focus is always on expected results.

Cost-benefit analysis.

We will call them "future-oriented". Their focus is on what comes next.

So what I want to argue is that the time paradox, the paradox of the time perspective, influences every decision you make, but you are totally unaware of it.

In other words, to what extent do you have any of these biased views of time?

Well, actually there are six. There are two ways to become present-oriented.

There are two ways to be past-oriented, and two ways to be future-oriented.

You can focus on the past positive or the past negative.

You can be a hedonist right now, focused on the joys of life, or you can be a fatalist right now, it doesn't matter, your life is under control.

Be future oriented and set goals.

Alternatively, you can become a transcendental future. That is, life begins after death.

Developing the mental flexibility to fluidly change your perspective of time as circumstances demand is what you have to learn.

So, out of the blue, what is the optimal time profile?

High past positive rate. The future is somewhat high.

And now he is a moderate about hedonism.

And always downplay past negativity and present fatalism.

Therefore, the best temporal combinations come from the past, from which the positive gives roots. You connect your family, your identity, and yourself.

What you get from the future is wings to reach new destinations and new challenges.

The takeaway from current hedonism is energy, energy to explore yourself, places, people, and sensuality.

Excessive perspective produces more negatives than positives.

What do futures sacrifice for success?

They sacrifice family time. They sacrifice their friends' time.

You're sacrificing fun times. They sacrifice personal luxury.

They sacrifice their hobbies. And they sacrifice sleep. Therefore, it affects their health.

And they live for work, achievement and control.

I think some TEDsters can relate to this.

(Laughter) And it resonated for me. I grew up a poor kid in a ghetto, Sicilian family in the South Bronx. Everyone lived past and present.

I am here as a future-minded person who has gone too far, made all the sacrifices, and made me future-minded because of my teacher's intervention.

They told me not to eat the marshmallows until I was able to balance them, they would give me two if I waited.

Add in the hedonism of the present and focus on the positives of the past, and now, at 76, I'm more energetic, more productive, and happier than ever.

My point is that we apply this to many of the world's problems. changing school dropout rates, fighting addiction, improving teen health, curing veterans' PTSD with time metaphors, obtaining miracle cures, promoting sustainability and conservation, reducing physical rehabilitation in areas with 50 percent dropout rates, changing appeals to suicidal people, and fixing conflicts between families due to time zone differences.

Therefore, I would like to end with these words. Many of life's puzzles can be solved by understanding your own and others' perspectives of time.

The idea is very simple and obvious, but I think the consequences are very serious.

Thank you very much.

(applause)

In 2013, a team of researchers conducted a math test.

The trial will be conducted in more than 1,100 American adults and is partly intended to test their ability to evaluate a set of data.

Hidden within these math problems were two nearly identical problems.

Both problems used the same difficult data set, and each had one objectively correct answer.

The first question was about the correlation between rashes and new skin creams.

The second question asked about the correlation between crime rates and gun control laws.

Participants with good math skills were much more likely to get the first question correct.

However, the results for the second question looked quite different, even though they were mathematically the same.

Here, math skills were not the best predictors of how participants would answer correctly.

Instead, another variable the researchers tracked came into play: political identity.

Participants whose political beliefs matched the correct interpretation of the data were much more likely to answer questions correctly.

Even the top mathematicians in the study were 45% more likely to get the second problem wrong if the correct answer ran counter to their political beliefs.

What in politics causes this kind of illogical fallacy?

Can someone's political identity actually affect their ability to process information?

The answer lies in a cognitive phenomenon that has become increasingly visible in public: partisanship.

Partisanship is often referred to in the context of politics, but is more broadly defined as a strong preference or prejudice toward a particular group or idea.

Our political, ethnic, religious and national identities are all forms of partisanship.

Of course, integration with social groups is an essential and healthy part of human life.

Our sense of self is defined not only by who we are as individuals, but also by the groups we belong to.

As a result, we have a strong motivation to defend our group identity and protect both our self-consciousness and our social community.

However, this becomes a problem when the group's beliefs differ from reality.

Imagine watching your favorite sports team commit a serious foul.

You know it's against the rules, but your fellow fans think it's perfectly acceptable.

The tension between these two conflicting thoughts is called cognitive dissonance, and most people try to resolve this uncomfortable ambivalence.

They may start blaming the referee, complaining about what the opposing team started, or even assuming that the foul never happened in the first place.

In such cases, people are often stronger in maintaining positive relationships with their group than in accurately perceiving the world.

This act is especially dangerous in politics.

On a personal scale, party loyalty allows people to establish a political identity and support policies they agree with.

But partisan-based cognitive dissonance can cause people to reject evidence that contradicts party policy or discredites party leaders.

And when whole groups of people modify facts based on partisan beliefs, it can lead to policies that are not based on truth or reason.

This issue is not new. Political identity has existed for centuries.

However, research has found that partisan polarization has increased dramatically over the last few decades.

One theory to explain this increase is that like-minded communities tend to concentrate geographically.

Another is the growing reliance on partisan news and the social media bubble.

These often act like echo chambers, delivering news and ideas from like-minded people.

Fortunately, cognitive scientists have discovered several strategies to resist this distortion filter.

One is to remember that you may be more biased than you think.

So when you come across new information, push through your initial intuition and make a deliberate effort to evaluate it analytically.

Strive to make fact-checking and questioning assumptions an important part of the culture in your group.

It is also helpful to warn people that they may have been misinformed.

Also, when trying to persuade others, affirming their values ​​and framing the problem in their language can help make people more receptive.

We still have a long way to go before solving the partisanship problem.

But hopefully, these tools will help us be better informed and able to make evidence-based decisions about our shared reality.

We talk about post-conflict recovery and how to do it better.

The post-conflict recovery track record is less impressive.

Historically, 40% of all post-conflict situations revert to conflict within 10 years.

In fact, they account for half of the civil war.

Why are the records so bad?

Well, the traditional approach to post-conflict situations has been based, so to speak, on three principles.

The first principle is that politics matter.

Politics is the first priority.

Try a political solution first.

And the second step is to say, "It's true that the situation is dangerous, but only for the short term."

So send peacekeepers there, but let them go home as soon as possible.

So short-term peacekeepers.

And third, what would be the peacekeepers' exit strategy?

It's an election.

Then there will be a legitimate and responsible government.

That's the traditional approach.

I think that approach denies reality.

It turns out that there is no quick fix.

Admittedly, there are no instant security fixes.

In the post-conflict decade, I have considered the risks of relapse to conflict.

And the risks remain high throughout the decade.

And maintain high standards regardless of political innovations.

Do elections produce responsible and just governments?

Elections produce winners and losers.

And the loser is not reconciled.

In reality, the order should be reversed.

Politics is not first. Finally, there is politics.

Building on a foundation of security and economic development—rebuilding prosperity—makes politics easier as the decade goes on.

Why is politics easy?

And why is it so difficult at first?

Because after years of stagnation and decline, political thinking is a zero-sum game.

If reality is stagnant, even if you fall, I have no choice but to rise.

And it doesn't create productive politics.

Productive politics therefore requires a shift in thinking from zero-sum to positive-sum.

Spiritual change can only be viewed positively when prosperity is being built in reality.

And to build prosperity, we need to ensure security.

So when you face reality, you get it.

But the purpose of facing reality is to change reality.

So I would like to propose two complementary approaches to change the real situation.

The first is recognizing the interdependence of the three main actors. These actors are different actors and currently do not work together.

The first entity is the Security Council.

The Security Council is usually responsible for dispatching security-building peacekeeping forces.

And, first of all, we need to recognize that peacekeeping works.

This is a cost effective approach.

Improves security.

But it has to be done long-term.

We need a decade-long approach, not just a few years.

It is one of the entities known as the Security Council.

A second actor, another cast guy, is a donor.

Donors provide post-conflict assistance.

In the past, donors have typically been interested for the first few years and then bored.

They moved on to another situation.

Post-conflict economic recovery is a slow process.

There is no faster process in economics than decline.

It can be done very quickly.

(Laughter) So the donor has to put up with this situation for at least 10 years.

And the third major actor is the post-conflict government.

And there are two important things it must do.

One is that instead of making a fuss about the constitution of politics, we must reform the economy.

Economic policy must be reformed.

why? This is because economic policies usually deteriorate during conflicts.

The government robs them of short-term opportunities, and by the time the conflict is over, the chickens will be back in their roosts.

So the legacy of this conflict is really bad economic policy.

So there is an agenda of reform and an agenda of inclusivity.

The challenge of inclusion does not come from elections.

Elections create losers and eliminate losers.

So the inclusion agenda is really about getting people into the tent.

So these three actors.

And they are interdependent over time.

Without a Security Council commitment to security over a decade, there will be no peace of mind to generate private investment.

Without policy reform and aid, there will be no economic recovery, which is the true exit strategy for peacekeepers.

Therefore, we need to recognize our interdependence through formal mutual commitments.

In fact, the United Nations has a language for recognizing these mutual commitments, mutual commitments. It's called a compact language.

Therefore, a post-conflict agreement is required.

The United Nations even has agencies that can broker these agreements. It is called the Peacebuilding Commission.

It would be ideal to have a standard set of norms in which such mutual commitments from the three parties are expected when faced with a post-conflict situation.

That's idea one. Recognizing interdependence.

Now let's move on to the complementary second approach.

And that is to focus on some key goals.

A typical post-conflict situation is a zoo with different actors with different priorities.

And indeed, unfortunately, navigating based on your needs gives you a very unfocused agenda. Because in this situation, needs are everywhere, but the ability to implement change is very limited.

Therefore, we need to be disciplined and focus on what matters.

And I would suggest three things are important in a typical post-conflict situation.

One is work.

One is to improve basic services, especially health, which is a disaster in times of conflict.

That means jobs, health and clean government.

These are three key priorities.

So let's talk a little bit about each.

Jobs.

What are the unique approaches to creating jobs in post-conflict situations?

And why is work so important?

Jobs for whom? Especially jobs for young men.

In post-conflict situations, it is not because older women are upset that they often return to conflict.

Because young people get irritated.

And why are they upset? because they have nothing to do.

Therefore, we need a process that quickly creates jobs for ordinary young people.

Well, it's hard.

Governments in post-conflict situations often respond by increasing civil servant services.

that's not a good idea.

it's not sustainable.

In fact, we are building up long-term debt by inflating the burden on public servants.

But expanding the private sector is also difficult because any activity open to international trade is essentially uncompetitive in a post-conflict situation.

It is not an environment in which an export-oriented manufacturing industry can be built.

There is one sector that is not exposed to international trade and could create a lot of jobs, and in any case it would be wise to expand after the conflict, and that is the construction sector.

The construction sector is clearly playing an important role in recovery.

But usually the sector declines during conflict.

During conflicts, people are committing acts of vandalism.

No work is underway. And this sector is shrinking.

And when you try to extend it, you run into a lot of bottlenecks because it shrinks.

Basically, prices will go up and rogue politicians will squeeze the rent out of that industry, but it will not create jobs.

A policy priority is therefore to remove bottlenecks in the expansion of the construction sector.

What's the bottleneck?

Consider what you have to do to successfully build a structure with a lot of effort.

First you need access to land.

Due to a broken legal system, people often cannot even access land.

Then you need skills that are everyday skills in the construction sector.

Post-conflict situations require not just Doctors Without Borders, but Bricklayers Without Borders to rebuild their skill sets.

We need companies. The company has disappeared.

Therefore, it is necessary to promote the growth of local businesses.

Then you will not only get jobs, but you will also get public infrastructure improvements, public infrastructure restoration.

I would like to move from work to the second goal of improving basic social services.

And to this day, there is a kind of schizophrenia within the donor community about how to build basic services in the post-conflict sector.

On the one hand, it is a lip service to the idea of ​​rebuilding an effective state in the image of 1950s Scandinavia.

Let's develop this, that, and other ministries that provide these services.

And this is schizophrenic. Because donors know in their hearts that it's not a realistic agenda. So what they do is also a complete workaround, just funding NGOs.

Neither approach is wise.

So what I would like to propose is what I call an independent service agency.

The function of the Ministry of Monopoly Lines will be divided into three.

Planning and policy functions are located within the Ministry. When providing services in the field, churches, NGOs, local communities, whatever works should be used.

And in between, there should be an independent service authority, a public agency that channels public funds, especially donations, to retailers.

NGOs are therefore part of the public government system rather than independent of it.

One of its advantages is the consistent allocation of funds.

Another is that we can hold NGOs accountable.

Scale competition can be used, so they must compete with each other for resources.

Good NGOs like Oxfam are very enthusiastic about this idea.

They want to be disciplined and responsible.

This is how you scale up a basic service.

And since the government will fund them, they will be co-branding these services.

So it's not provided thanks to the US government and some NGOs.

These will be co-branded as being done by domestic post-conflict governments.

That means jobs, basic services and finally clean government.

Clean means following their money.

A typical post-conflict government is so underfunded that it needs our money just to get life support.

Without funding the core budgets of these countries, the basic functions of the state cannot be carried out.

But we know there is no perfect budget system that means that when we put money into the core budget, it's spent properly.

And if we just put the money in and close our eyes, it's not just that the money is wasted, it's the least of it, that the money is being seized.

It has been captured by crooks who are at the center of political affairs.

That's why we unconsciously empower people with problems.

So building a clean government certainly means funding the budget, but it also means offering a lot of scrutiny. That means a lot of technical assistance with the funding.

"I realized what I needed was Accountants Without Borders chasing that money," Paddy Ashdown, a former Bosnian UN official, said in a book about his experience.

Here is the package. Here is the package.

What is your goal?

What do you want to achieve by following this?

Ten years from now, a focus on the construction sector would have created both jobs and security, and would have rebuilt infrastructure because young people had jobs.

We will focus on the construction sector.

A focus on the provision of basic services by these independent service authorities would have saved basic services from catastrophic levels and given the public a sense that the government was doing something useful.

An emphasis on clean government would have gradually shut out political thugs, as there would be no money to participate in politics.

And gradually, the choice and composition of politicians will shift from crooked to honest.

Where will it leave us?

Gradually move from the politics of looting to the politics of hope. thank you.

(applause)

I want to help you rediscover what philanthropy is, what it can be, and how it relates to you.

And in doing so, I hope to offer you a vision, an imaginary future, where, as poet Seamus Heaney put it, "For once in a lifetime, a much-needed wave of justice can rise, where hope and history can rhyme."

I want to start with these word pairs here.

We all know which side we want to be on.

When philanthropy was reinvented a century ago, when the foundation form was actually invented, they didn't think they were wrong about any of these aspects.

In fact, they would never have thought of themselves as closed, in their own ways, slow to new challenges, small and risk-averse.

And actually it wasn't. They were then reinventing philanthropy, which Rockefeller called "philanthropy."

But by the end of the 20th century, a new generation of critics and reformers had come to think of philanthropy in just this way.

What is remarkable as the global philanthropy industry is born, and that is exactly what is happening, is how the desire arises to upend these old assumptions and make philanthropy open, large, fast, connected, and useful in the long run.

This entrepreneurial spirit springs from many directions.

And it's driven and driven, like many here, by new leaders, by new tools like the ones you've seen here, and by new pressures.

I have been observing and participating in this change for quite some time.

This report is our primary public report.

This book tells the story that today can really be as historic as it was 100 years ago.

All I want to do is share with you some of the coolest things happening right now.

In doing so, I'm not going to think too much about the very large philanthropic efforts that everyone already knows about: Gates, Soros, Google.

Instead, what I want to do is talk about philanthropy for all of us—the democratization of philanthropy.

This is a moment in history when the average person has more power than ever before.

What I'm about to do is examine five categories of experiments that challenge old assumptions about philanthropy.

The first is large-scale collaboration, represented here by Wikipedia.

Well, this might surprise you.

But remember, philanthropy is about giving time and talent, not just money.

Clay Sharkey, the great chronicler of all things networked, captures the assumption that this difficulty is happening in a very beautiful way.

“We live in a world where we do small things for love and big things for money,” he said.

Now we have Wikipedia.

Suddenly you can do big things for love. ”

Check out Paul Hawken's new book this spring. As many of you may know, he is also an author and entrepreneur.

The book is called "Blessed Anxiety."

And when it's released, a series of wiki sites will launch simultaneously under the WISER label.

WISER stands for Global Index for Social and Environmental Responsibility.

WISER seeks to document, connect and empower what Paul calls the largest and fastest growing movement in human history: humanity's herd immune response to today's threats.

Well, all these big things about love—experiments—are going to go wrong.

But what makes it happen will be the biggest, most open, fastest, most connected philanthropy in human history.

The second category is online charity marketplaces.

Of course, this is in charity work, just like it is in eBay or Amazon commerce.

Think of this as peer-to-peer philanthropy.

And this calls into question another premise that organized philanthropy is reserved for the very wealthy.

If you haven't already, visit DonorsChoose.

Omidyar Network is heavily invested in DonorsChoose.

It's one of the best-known of these new marketplaces where donors can go directly to classrooms and connect with teachers' needs.

The next time you're in need of a wedding gift or holiday present, check out Changing the Present, started by a TEDster.

GiveIndia is country-wide.

And it goes on and on.

The third category, represented by Warren Buffett, is what I call "collective giving."

It's not just that Warren Buffett was surprisingly generous in that historic act last summer.

That is, he challenged another assumption that every donor should have his own endowment or foundation.

Today, many new funds are emerging that aggregate donations and investments, rally people around common goals, and think bigger.

One of the best known is the Acumen Fund, led by TED star Jacqueline Novogratz, who has a huge following here at TED.

But there are many others: Cambridge's New Profit, Silicon Valley's New School Venture Fund, Washington's Venture Philanthropy Partners, San Francisco's Global Fund for Women.

look at these.

These funds are similar to philanthropic venture capital, private equity, and even mutual fund investments, but with a twist. Because communities often form around these funds, as happens in Acumen and elsewhere.

Now imagine for a moment the first three types of experiments: large-scale collaboration, online marketplaces, and collective donations.

And see how they can help you rethink what organized philanthropy is.

It's not necessarily about the foundation. It's about the rest of us.

And imagine these things being mashed up in the future when they are experimented with together. For example, imagine someone donated $100 million to an inspirational cause. There were 21 gifts of $100 million or more in the US last year, and it's not out of the question. However, it can only be presented when it matches the millions of small gifts from around the world, thereby attracting more people, increasing visibility, and drawing people into a set goal. .

Let's take a quick look at the fourth and fifth categories: innovation, competition, and social investment.

They bet that visible competition and prize money could attract talent and money to some of the toughest problems, thereby accelerating their solutions.

This addresses yet another premise that the donor and the organization are at the center rather than putting the issue at the center.

You can enlist these innovators, especially if you need a technical or scientific solution.

That leaves us with the last category, social investing. This one is actually the biggest of all categories anyway and is represented here by Xigi.net.

And this, of course, goes against the biggest premise that business is business and philanthropy is a vehicle for those who want to make a difference in the world.

Xigi is a new community site built by the community to link and map this new social capital marketplace.

It already lists 1,000 entities that provide bonds and equity to social enterprises.

So we can rely on these innovators to remind us that even a small amount of profit-seeking capital can produce amazing good things.

Now, what's really interesting here is that we're not thinking of new acting methods. We are moving towards a new way of thinking.

Charity is being reorganized before our eyes.

And I think this is the new zeitgeist, although every experiment and every big provider has yet to fulfill this aspiration. Open, big, fast, connected, and let us hope too, long.

You have to realize that it takes a long time to do these things.

If we don't have the strength to stick with something, stick with it, whatever it is. All this stuff ends up being just a fad.

But I'm really looking forward to it.

And I'm hopeful because it's not just philanthropy that's undergoing restructuring, the social sector and the rest of business as a whole are busy trying to "business as usual."

And everywhere I go, including here at TED, I feel a new moral hunger growing.

What we are seeing is that people are seriously struggling to explain what this new event is taking place.

Words like “philanthropic capitalism,” “natural capitalism,” “philanthropic entrepreneur,” and “venture philanthropy.”

We don't have a language for it yet.

Whatever we call it, I think it's new, it's starting, and it's going to be very important.

And the future I imagine will appear there. Let's call it the social singularity.

Many of you may have noticed that I have plagiarized a bit of science fiction author Verner Vinge's concept of a technological singularity. At the technological singularity, many trends will accelerate and converge, coming together to create a truly astonishing new reality.

Perhaps the coming social singularity is what we fear most: catastrophe, environmental destruction, weapons of mass destruction, pandemics, and the convergence of poverty.

Because our ability to face the problems we face has not caught up with our ability to create them.

And as we heard here, it's safe to say that we hold the future of civilization in our hands like never before.

The question is, do positive social singularities exist?

Is there a frontier for how we live together?

We don't have to imagine our future.

We can create a future where hope and history rhyme.

But there is a problem.

Our past experiences have not prepared us, individually or collectively, for what we need to do or who we need to be.

We need a new generation of civic leaders who are willing to grow, change and learn as quickly as possible.

There is one last thing I would like to show you.

This is a photo of my grandfather and great-grandfather taken about 100 years ago.

This person is a newspaper publisher and a banker.

And they were great community leaders.

And yes, they were great philanthropists.

I keep this photo near me and it's in my office. Because I always felt a mysterious connection to these two men. I didn't know either of them at all.

So, in their honor, I would like to offer this blank slide.

And imagine this is your photo.

And I want you to think about the community you want to create.

whatever that means to you.

And imagine, 100 years from now, your grandchildren, great-grandchildren, nieces, nephews, children of God, looking at this picture of you.

What story do you most want to tell them?

thank you very much.

(applause)

A month ago today, I stood at 90 degrees south latitude, the top of the world, the geographic South Pole.

And I was standing next to two very good friends, Richard Webber and Kevin Valerie.

Together we had just broken the world speed record for trekking to the South Pole.

It took 33 days, 23 hours and 55 minutes to get there.

It was 5 days shorter than the previous best time.

In the process, I became the first person to complete the 650-mile journey from Hercules Bay to the South Pole on foot, without skis.

Now, many of you are probably saying, "Wait a minute, is this hard to do?"

(Laughter) Imagine that. As you saw in the video clip above, imagine dragging a 170-pound loaded sled with everything you need to survive your trip to Antarctica.

It's below 40 degrees every day.

You will be exposed to strong headwinds.

And at some point you have to cross an ice crack, a crevasse.

Some of them have very precarious narrow footbridges under them that can give way in an instant and take your sled into the abyss and never to be seen again.

What is the punchline of your trip? Look at the horizon

Yes, the South Pole is at an altitude of 10,000 feet, and the starting point is 0 meters above sea level, so it's all uphill.

In fact, our journey didn't start at Hercules Cove, where the frozen ocean meets Antarctica.

It started just under two years ago.

A few friends and I have just completed a 111-day run across the Sahara Desert.

And while we were there, we learned about the seriousness of North Africa's water crisis.

We also found that many of the problems facing people in North Africa affect young people the most.

When I came home to my wife after 111 days of running in the sand, I said, "If this Bozo can cross the desert, then surely we can do anything we set our minds to."

But if I'm going to continue these adventures, I have to have a reason to do it, not just get there.

Around that time, I met an extraordinary man named Peter Tam, who inspired me with his actions.

He seeks to find and solve water problems and crises around the world.

His dedication gave me the idea for this expedition. It is an expedition to the South Pole, and an interactive website allows young people, students and teachers from all over the world to join the expedition as active members.

So we have a live website, we blog every day for 33 days, we talk about ozone depletion, and we're going to get burned if we don't cover our faces.

Mile over Sastrgi, a frozen ice drift that can be waist-deep.

I mean, if you traverse these things with a 170 lb sled, the sled might as well have weighed 1,700 lbs. Because it felt that way.

We blogged daily to this live website for students who were following us as well, and trekked about 10, 15, sometimes 20 hours each day to reach our goals.

By the way, we were taking a nap on a sleigh ride at 40 degrees altitude.

In turn, students and people from all over the world have asked us questions.

Young people will ask the most amazing questions.

One of my favorites is "It's 40 degrees. I need to go to the bathroom. Where are you going? What are you going to do?"

I'm not going to answer that. However, we will answer some of the most frequently asked questions.

where do you sleep We slept in tents very low to the ground because the winds in Antarctica are so strong they blow everything else away.

what do you eat One of my favorite dishes on the road is butter and bacon. About a million calories.

I needed it because I was burning about 8,500 a day.

How many batteries do you carry for all the devices you own?

Practically not. All equipment, including the filming equipment, was charged by sunlight.

And are you on good terms? I hope so. Because at some point during this expedition, one of your teammates will have to take a very large needle, put it in an infected blister, and pull the needle out for you.

But seriously, seriously, we had a common goal of wanting to inspire these young people, so we hit it off.

They were our teammates! They inspired us.

The stories we heard took us to Antarctica.

This website worked wonderfully as a two-way communication.

Young people in northern Canada, elementary school kids pretending to be Richard, Ray and Kevin dragged a sleigh across the schoolyard. wonderful.

We have arrived in Antarctica. We huddled in a tent that day when the temperature was below 45 degrees. I will never forget.

We looked at each other in disbelief at what we had just completed.

And I remember looking at them and thinking, 'What can I get out of this journey? Look? seriously.

You mean I'm this super patient guy?

As I stand here today talking to you, I've been running for a total of five years.

And a year before that, I was a pack-a-day smoker with a sedentary lifestyle.

What I've taken from this journey, and mine, is, indeed, in every strand of my belief standing here, I know that we can make the impossible possible.

I'm 40 and studying this.

Can you imagine? Seriously, can you imagine?

I learned this when I turned 40.

Imagine your 13-year-old self hearing those words and believing them.

thank you very much. thank you.

(applause)

London, 1928: Mold spores breeze across the lab.

They hover over petri dishes and spark a medical revolution when they land.

The lab belongs to Alexander Fleming, a Scottish scientist who studies the properties of infectious bacteria.

Fleming is currently on vacation.

When I came back, I noticed a mold colony growing on the Petri dish I forgot to put in the incubator.

And around this mold colony there is a zone that is unexpectedly completely free of bacteria.

While studying this mysterious phenomenon, Fleming realized that the mold secretes certain compounds that kill bacteria.

Fleming named the antibacterial compound "penicillin" because the mold was a species of the genus Penicillium. What Fleming accidentally discovered was a microbial defense system.

Penicillium mold constantly produces penicillin to protect itself from threats such as nearby bacterial colonies that can consume its resources.

Penicillin destroys many types of bacteria by interfering with cell wall synthesis.

These walls are strengthened by a thick protective mesh of sugars and amino acids that are constantly being broken down and rebuilt.

Penicillin binds to one of the compounds that weaves this mesh together, preventing the wall from rebuilding at a critical stage.

Penicillin, on the other hand, stimulates the release of highly reactive molecules that cause further damage.

Ultimately, the cell structure is completely destroyed.

This two-pronged attack is lethal to a wide range of bacteria, whether they reside in petri dishes, in our bodies, or elsewhere.

However, our own cells do not have cell walls, so they are not harmful.

Penicillin remained a curiosity in the laboratory for about ten years after Fleming's discovery.

However, during World War II, researchers isolated an active compound and found a way to make the mold grow in abundance.

They later won the Nobel Prize for their work.

A team at the University of Oxford and several American pharmaceutical companies continued to develop it, and within a few years it was on the market.

Penicillin and similar compounds have rapidly transformed the treatment of infectious diseases.

For now, they remain some of the most important, life-saving antibiotics used in medicine.

However, the more antibiotics we use, the more bacteria develop resistance to them.

In the case of penicillin, some bacteria produce compounds that can disrupt critical structures that interfere with cell wall synthesis.

As the use of antibiotics increases, more bacteria evolve this defense and these antibiotics become ineffective against an increasing number of bacterial infections.

This means that it is imperative that doctors do not overprescribe medications.

In contrast, 5-15% of patients in developed countries self-identify as allergic to penicillin, making penicillin the most commonly reported drug allergy.

However, the majority (over 90%) of people who think they are allergic to penicillin are actually not.

Why is there a misunderstanding?

Many patients develop a rash after treatment of an infection with penicillin or a closely related drug and acquire the allergy label in childhood.

Penicillin is often the cause of the rash, but more likely it is the original infection or a reaction between the infection and antibiotics.

However, a true penicillin allergy, where our immune system misidentifies penicillin as an aggressor, is rare and can be very dangerous.

So if you think you are allergic but are not sure, your best bet is to visit an allergist.

Tests are done to see if you have allergies.

Even if you are allergic to penicillin, the immune cells that respond to the drug may lose the ability to recognize it.

In fact, about 80% of people allergic to penicillin overcome the allergy within 10 years.

This is great news for people who are now aware they are allergic to penicillin. The drug may one day save their lives, as it has saved many others.

Now, if President Obama were to invite me to be the next Mathematics Czar, I would put forward to him a proposal that I believe would greatly improve mathematics education in this country.

And it's easy and cheap to implement.

Our mathematics curriculum is based on the foundations of arithmetic and algebra.

And everything you learn after that builds up towards a single subject.

Calculus is at the top of the pyramid.

And what I'm trying to say here is that I think it's the top of the wrong pyramid...

The right summit, which every student, every high school graduate, should know is statistics: probability and statistics.

(Applause) Don't get me wrong. Calculus is an important subject.

It is one of the wonderful creations of the human mind.

Natural laws are written in the language of calculus.

And all students studying math, science, engineering, and economics must learn calculus by the end of their freshman year.

But, as a math professor, what I want to say here is that very few people actually use calculus in their daily lives in a conscious and meaningful way.

Statistics, on the other hand, is a subject that can and should be used on a daily basis. right?

It's a risk. It's a reward. It's randomness.

It's about understanding the data.

If our students, high school students, and all Americans knew about probability and statistics, I don't think we would be in the economic turmoil we are in today. (Laughter) (Applause) That's not all -- thank you -- that's not all...

But when taught properly, it can be a lot of fun.

So probability and statistics, that's the mathematics of games and gambling.

I'm analyzing trends. It predicts the future.

Look, the world has changed from analog to digital.

And it is time for our mathematics curriculum to change from analogue to digital, from more classical continuous mathematics to more modern discrete mathematics: the mathematics of uncertainty, randomness and data, i.e. probability and statistics.

In summary, I think it would be much more meaningful if all students knew what 2 standard deviations from the mean means, rather than having them learn calculus techniques. And I mean it.

thank you very much.

(applause)

In the mid-19th century, suspension bridges collapsed all over Europe.

Industrial cables were frayed in heavy weather and snapped under the weight of the deck.

So when a German-American engineer named John Roebling proposed building the largest and most expensive suspension bridge ever devised over New York's East River, city officials were understandably skeptical.

But Manhattan became increasingly overcrowded, with commuters from Brooklyn clogging the river.

In February 1867, the government approved Roebling's proposal.

To avoid European bridge failure, Roebling designed a hybrid bridge model.

From the suspension bridge, he incorporated large cables anchored on each bank, supported by a central pillar.

This design was ideal for supporting long decks suspended from small vertical cables.

However, Roebling's model also referenced cable-stayed bridges.

These short structures supported the decks with diagonal cables that ran directly to the support towers.

By adding these cables, Roebling increased the stability of the bridge while also reducing the weight of the anchor cables.

Similar designs were used for several other bridges, but the scope of Roebling's plans here dwarfed them all.

His new bridge slab was over 480 meters long, 1.5 times longer than any suspension bridge ever built.

A standard hemp rope would tear under 14,680 tons of floorboards, so his proposal required over 5,600 kilometers of metal wire to create the cables for the bridge.

To support all this weight, the tower would have to stand more than 90 meters above sea level, making it the tallest structure in the Western Hemisphere.

Roebling was confident that his design would work, but while surveying the site in 1869, an oncoming boat pushed his foot against the dock.

He died of tetanus less than a month later.

Luckily, John Roebling's son, Washington, was also an engineer by training and took over his father's role.

The next year, the foundation work of the tower finally began.

The first step in this construction was also the most difficult task.

A largely untested technology called pneumatic caissons was used to build on the rocky riverbed.

Workers lowered these airtight crates into the river, from where a system of pipes pumped pressurized air and water out.

Once the airlock was established, workers could enter the room and excavate the river bed.

They put a layer of stone on top of the caisson while they were excavating.

When it finally hit bedrock, it was filled with concrete and became the permanent foundation of the tower.

Working conditions in these caissons were miserable and dangerous.

The room, which was lit only by candles and gas lamps, caught fire several times, forcing evacuation and flooding.

Even more dangerous was a mysterious disease called "bend."

Today we understand this as decompression sickness, but at the time it appeared to be unexplained pain or dizziness that killed several workers.

In 1872, the chief engineer's life was nearly killed.

Washington survived, but was paralyzed and bedridden.

But once again, the Roebling family proved to be indomitable.

Washington's wife, Emily, soon took over day-to-day project management, as well as being responsible for communication between her husband and the engineers.

Unfortunately, the bridge problem was not over yet.

By 1877, construction was over budget and behind schedule.

To make matters worse, it turned out that the bridge's cable contractor was selling faulty wires.

This would have been a fatal flaw if it weren't for the abundant fail-safes in John Roebling's design.

After reinforcing the cables with additional wires, the deck was hung piece by piece.

It took 14 years to build, cost more than $400 million in modern dollars, and took the life work of three different Roebling families, but when the Brooklyn Bridge finally opened on May 24, 1883, it was undeniable.

Today, the Brooklyn Bridge still stands atop antique caissons, supporting cables that cross the Gothic towers that make up the gateway to New York City.

This is exactly the moment I started making Tinkering School.

Tinkering School is a trusted place for children to pick up sticks, hammers and other dangerous objects.

Trust not to hurt yourself, trust not to hurt others.

Tinkering School does not follow a set curriculum and there are no tests.

We are not trying to teach anyone anything specific.

When the children arrive, they are faced with lots of things: wood, nails, ropes, wheels and real tools.

For children, it is an immersive experience of 6 days.

In it, we can offer our children time. This is the time that seems to be missing in a life with too many schedules.

Our goal is to have them leave with a better understanding of how things are made than when they arrived, and to ensure that they have a deep inner realization that they can playfully figure things out.

Nothing ever goes according to plan...never.

(Laughter) And children soon learn that not all projects go wrong -- (Laughter) and become comfortable with the idea that every step of a project is one step closer to either sweet success or hilarious disaster.

Start by scribbling or sketching.

And sometimes we make real plans.

And sometimes we just start building.

Building is central to the experience, hands-on, deeply immersive, and fully committed to the problem at hand.

As collaborators, Robin and I will tilt the project towards completion.

Successes are ongoing, failures are celebrated and analyzed.

Problems become puzzles and obstacles disappear.

A very interesting behavior of embellishment emerges, especially when faced with difficult setbacks and complexities.

(Laughter) Decorating an unfinished project is a kind of conceptual incubation.

In between are the deep insights and amazing new approaches to solving problems that were frustrating just a short time ago.

All materials are available.

Even a mundane, hateful plastic bag can be a more powerful bridge than anyone could have imagined.

And what they build amazes even themselves.

Video: Three, Two, One, Go!

Gever Tulley: A roller coaster made by a 7-year-old.

Video: Yay!

(Applause) GT: Thank you. I was very happy.

(applause)

Can you hear me?

Audience: Yes.

Jim Hudspes: Okay. If you can do that, it's really amazing. Because my voice changes the air pressure where you are sitting by just a few billionths of the atmospheric pressure. Yet we take it for granted that your ears can pick up on those tiny signals and use them to send signals to your brain for the full range of auditory experiences, such as human voices, music, and the natural world.

How do your ears do that?

And the answer is through the cells that are the real protagonists of this presentation: sensory receptors in the ear called "hair cells."

Now, unfortunately, these hair cells have absolutely nothing to do with the type of hair I'm getting less and less of, hence the name.

These cells originally got their name from an early microscopist who noticed a small clump of bristles protruding from one end of the cell.

Modern electron microscopy allows us to better see the nature of the special features that give hair cells their name.

That's the hair bundle.

Upright at the top of the cell are clusters of 20 to several hundred thin cylindrical rods.

And this device is for you to hear my voice in this moment.

Well, I must say I am somewhat in love with these cells.

I've been with their company for 45 years -- (laughter) part of the reason is that they're just beautiful.

It has an aesthetic element to it.

For example, here are the cells in which a normal chicken hears.

These are the cells bats use for sonar.

We use frog large hair cells for many of our experiments.

Hair cells are present down to the most primitive fish, and reptilian hair cells often have this very beautiful, almost crystalline order.

But more than beauty, hair bundles are antennas.

This is a machine that converts sound vibrations into electrical responses that the brain can interpret.

As you can see in this image, at the top of each tuft there are fine filaments (stereocilia) that connect each of the tiny hairs.

It has a small red triangle attached to it.

And at the base of this filament are several ion channels, proteins that span the membrane.

And this is how it works.

This rat trap represents an ion channel.

It has pores that let potassium and calcium ions pass.

It has small molecular gates that can be opened and closed.

And that status is set by this elastic band that represents the protein filaments.

Now imagine that this arm represents one immotile, and this arm represents a short adjoining immotile with an elastic band in between.

When sound energy hits a tuft, it pushes the tuft towards the higher end.

A stereocilia slide opens the channel, putting tension on the link until the ions rush into the cell.

The channel closes when the tuft is pushed in the opposite direction.

And most importantly, the back-and-forth motion of the tuft that occurs during the application of sound waves alternately opens and closes the channels, allowing millions of ions to enter the cell through each opening.

These ions constitute the current that excites the cell.

Excitement travels down nerve fibers and travels to the brain.

Note that the strength of the sound is represented by the magnitude of this response.

The louder the sound, the farther the tuft is pushed, the longer the channel is open, the more ions are taken in, and the greater the reaction.

This mode of operation has the advantage of being very fast.

Some of our senses, such as sight, use chemical reactions that take time.

As a result, showing a series of photos at intervals of 20 or 30 per second feels like a series of images.

Because they don't use responses, hair cells are a whopping 1,000 times faster than other senses.

We can hear sounds at frequencies as high as 20,000 cycles per second, and some animals have even faster ears.

For example, the ears of bats and whales can respond to sonar pulses at 150,000 cycles per second.

But this speed alone doesn't fully explain why our ears perform so well.

And it turns out that our hearing benefits from an amplifier called "active processes".

Active processes enhance our hearing and enable all the remarkable functions already mentioned.

Let me explain how it works.

First of all, the active process amplifies the sound, so at the threshold we can hear the sound of moving hair strands at a distance of only about three tenths of a nanometer.

It is the diameter of one water molecule.

It's really amazing.

The system can also operate over a very wide dynamic range.

Why is this amplification necessary?

In ancient times, amplification was useful because it allowed us to hear the tiger's voice before it could hear us.

And recently, it has become indispensable as a remote early warning system.

Being able to hear the sounds of modern hazards such as fire alarms and speeding fire trucks and police cars is priceless.

When amplification fails, our hearing becomes less sensitive and may require electronic hearing aids to replace damaged biological hearing aids.

This active process also enhances frequency selectivity.

An untrained person can distinguish between two notes that differ by only 2/10 percent, which is 1/30 of the difference between two notes on a piano, and a trained musician can perform even better.

This fine-grained discrimination helps your ability to distinguish between different voices and understand nuances in speech.

And, again, when active processes deteriorate, verbal communication becomes difficult.

Finally, the active process helps us set a very wide range of sound intensities that our ears can tolerate, from very low audible sounds, such as the sound of a pen dropping, to the loudest sounds that can be tolerated, such as the sound of a jackhammer or a jet plane.

The amplitude of sound is in the range of a million times, which is beyond the range encompassed by any other sense or artificial device I know of.

And, again, when this system deteriorates, the affected person may have difficulty hearing very soft sounds or may have difficulty tolerating very loud sounds.

Now, to understand how hair cells work, we need to place them within the environment within the ear.

We learn in school that the organ of hearing is a coiled, snail-shaped cochlea.

An organ the size of a chickpea.

It is embedded in the bones on either side of the skull.

We also learned that an optical prism splits white light into its constituent frequencies, which we see as distinct colors.

In a similar way, the cochlea acts as a kind of acoustic prism that splits complex sound into its component frequencies.

Therefore, when the piano is played, various sounds are mixed together to form a chord.

The cochlea reverses that process.

Separate them and represent each in a different position.

In this diagram you can see where the three notes (the middle C note and the two edge notes of the piano) are represented in the cochlea.

The lowest frequencies reach the upper part of the cochlea.

The highest frequencies up to 20,000 Hz reach the base of the cochlea, and all other frequencies appear somewhere in between.

And, as this figure shows, successive musical tones are represented dozens of hair cells apart along the surface of the cochlea.

Now, this separation of frequencies is very important to our ability to discriminate between different sounds. Because the instrument itself, every voice, emits a distinct set of sounds.

The cochlea separates these frequencies and 16,000 hair cells report to the brain how many of each frequency are present.

The brain then compares all nerve signals to determine which specific sounds are being heard.

But this doesn't explain everything I want to explain.

where's the magic?

We've already talked about the amazing things that hair cells can do.

How does it run an active process and perform all the notable functions mentioned at the beginning?

The answer is instability.

We thought of the tuft as a passive object, just there unless it was stimulated.

But in reality it is an active machine.

We constantly use our internal energy to do mechanical work and enhance our hearing.

Therefore, even when at rest, an active hair tuft is always trembling without any input.

Constantly jerking back and forth.

But even if it's a weak sound, it picks it up and starts moving very cleanly one-on-one, and in doing so it amplifies the signal by about a factor of 1,000.

This same instability also enhances frequency selectivity. This is because certain hair cells tend to vibrate best at frequencies where they would normally vibrate when unstimulated.

So this device not only provides us with amazingly sharp hearing, but also very sharp adjustment.

I would like to briefly demonstrate something related to this.

Ask the person who operates the sound system to make it more sensitive to certain frequencies.

So in the same way that hair cells are tuned to one frequency, the amplifier will emphasize specific frequencies in my voice.

Notice how certain tones stand out more clearly from the background.

This is exactly what hair cells do.

Each hair cell amplifies and reports one specific frequency and ignores all others.

And the entire set of hair cells, as a group, can report to the brain exactly which frequencies are contained in a particular sound, allowing the brain to determine what melody is being heard, or what speech is intended.

Now amplifiers such as public address systems can also cause problems.

If you increase the amplification too much, it becomes unstable and starts to howl or make noise.

And one might wonder why active processes don't do the same.

Why don't our ears make sounds?

And the answer is, it does.

In a reasonably quiet environment, 70% of normal people emit one or more sounds from their ears.

(Laughter) Let me give you an example.

A normal human ear hears two emissions at high frequencies.

You may also be able to identify background noise such as microphone hiss, stomach rumbling, heartbeat, and clothing rustling.

(hum, mic hiss, weak faucet, clothes rustling) This is typical.

Most ears produce only a few sounds, but some produce as many as 30 sounds.

All ears are unique, so my right ear is different from my left ear, my ear is different from yours, but they continue to radiate the same spectrum of frequencies for years, even decades, unless they are damaged.

what happened?

It turns out that the ear can control its own sensitivity and amplification.

Therefore, in very noisy environments such as sporting events or music concerts, there is no need for amplification and the system is completely turned down.

If you're in a room like this auditorium, you might hear a little audio, but of course, the public address system does most of the work.

And finally, if you walk into a really quiet room where you can hear the pin drop, the system volume will be almost maxed out.

But when you enter an ultra-quiet room, such as a sound chamber, the system automatically spins up to 11, becomes unstable, and starts making noise.

And these releases are very strong evidence of how active hair cells are.

So, at the end of the day, I would like to move on to another question that may possibly come up. It's like, "Where do we go from here?"

I think there are three issues that I would like to tackle in the future.

First, what is the molecular motor responsible for hair cell amplification?

Somehow, nature has encountered systems that can oscillate or amplify at 20,000 cycles per second or more.

This is much faster than other biological oscillations, so we want to understand where it comes from.

A second issue is how to adjust hair cell amplification to cope with the acoustic environment.

Who turns a knob to increase or decrease amplification in quiet or loud environments?

And the third issue, which concerns us all, is what we can do about hearing loss.

Thirty million Americans, and more than 400 million people worldwide, routinely have significant problems understanding speech in noisy environments or on the phone.

Many have even greater deficits.

Moreover, these defects tend to worsen over time because human hair cells die and are not replaced by cell division.

However, it is known that animals other than mammals can also replace cells, and that cells in those creatures die or are replaced throughout their lives, allowing animals to maintain normal hearing.

Here is an example of a small zebrafish.

The top cell divides to produce two new hair cells.

After dancing a little, they calm down and go to work.

So if we can decipher the molecular signals these other animals use to regenerate their hair cells, we think we can do the same for humans.

And our group and many others are now working to revive these amazing hair cells.

Thank you for your attention.

(applause)

Let's start with my favorite muse, Emily Dickinson. He said, "Amazing is not knowledge, it is not ignorance."

It's what lies between who we believe we can be and traditions we may have forgotten.

And I think I've been very inspired, with so many great ideas and so many visions, listening to all the amazing people here.

Still, when you look at the outside environment, you can see how resilient the architecture is to change.

You can see how much resistance there is to such an idea itself.

we can come up with them. We can create incredible things.

Still, after all, changing walls is very difficult.

I applaud the polite box.

But I'm interested in creating spaces that didn't exist before. To create something that has never been before, a space that no one has ever entered but the mind and spirit.

And I think that's the foundation of architecture.

Architecture is not based on concrete, iron and earth elements.

It's based on wonder.

And that wonder is what created the biggest city, the biggest space we've ever had.

And I think that's exactly what architecture is. it's a story.

By the way, this is a story told through hard material.

But this is a story of struggle and effort against the impossible.

When you think of cathedrals, temples, pyramids, pagodas, and the great architecture of cities in India and other countries, you can imagine how wonderful this was not an abstract idea, but realized by people.

In other words, what is made can no longer be made.

Anything made can be made better.

That's what I believe to be the architecture that really matters.

These are the dimensions I want to work with.

It's very personal.

Perhaps that is not the dimension that art critics, architectural critics and urban planners appreciate.

But I think these are the oxygen we need to live in buildings, live in cities, and connect ourselves in social spaces.

Therefore, I believe optimism is what drives architecture forward.

It's the only profession where you have to believe in the future.

You can be a general, a politician, a depressed economist, a minor musician, a dark-colored painter.

But architecture is sheer ecstasy that the future could be better.

And I think that belief drives society.

And there is a certain evangelical pessimism all around us today.

However, I believe that it is precisely in times like these that architecture can grow through big ideas, not small ideas. Think about big cities.

Think Empire State Building or Rockefeller Center.

These were built in a time when, in some ways, they weren't the best of times.

But that energy and power of architecture has driven the entire social and political space these buildings occupy.

Again, I believe in expressiveness.

I was never a fan of neutrals.

I don't like neutrality in anything in life.

I think it's an expression.

It's like espresso coffee, it extracts the essence of the coffee.

That's what expression is.

A lot of architecture lacks it. Because we think of architecture as the realm of the powerless, a kind of national realm without opinion or value.

Yet I believe it is the expression of the city, of our own space, that gives architecture meaning.

And of course, expressive spaces are not silent.

Representation space is not just a space to confirm what we already know.

Expressive space may disturb us.

And I think that's part of life too.

Life is more than just an anesthetic to make us smile, it reaches out across the abyss of history to places we haven't been and probably would have been if we weren't lucky.

Again, radicals and conservatives.

Radical, what do you mean? It is ingrained and deeply rooted in tradition.

That is what architecture is, and I think it is radical.

It does more than just store the dead form of formaldehyde.

It is in fact a living connection with the cosmic events in which we participate, indeed an ongoing story.

It doesn't have good or bad endings.

This is actually a story in which our act itself drives the story in a special way.

Again, I believe in radical architecture.

You know that the Soviet architecture of that building has been preserved.

It feels like old Las Vegas.

It's about preserving the emotions, preserving the traditions that have kept the mind from moving forward, and of course fundamentally it's about confronting them.

And I believe that our architecture is a confrontation with our own senses.

That's why I don't think it's cool.

Cool architecture is highly rated.

I have always been against it. I think we need emotions.

Life without emotions would not really be life.

Even the heart is emotional.

There is no reason not to take a stand in the ethical realm, the philosophical mystery of what we are.

Therefore, I think emotions are an important aspect to introduce into urban space, urban life.

And of course we have emotional conflicts.

And I think that's what makes the world a wonderful place.

And, of course, I think the confrontation between the cool and the emotionless is a conversation fostered by the city itself.

I think that's the progress of the city.

It is not only the shape of the city, but the fact that it embodies not only the people who build it, but also the emotions of those who live in it.

The unexplainable and the comprehensible. You know, we often want to understand everything.

But architecture is not a language of words.

it's the language. But it is not a language that can be reduced to a series of programmatic notes that can be written orally.

Too many mundane buildings you see outside to tell you a story, but the story is so short it says, "We have no story to tell you."

(Laughter) So what's really important is introducing the actual architectural dimensions. It may be completely inexplicable in words, because they work with proportions, materials and light.

They connect themselves to various sources of information, a kind of complex vector matrix that is really embedded in the lives and histories of cities and people, rather than head-on.

Again, I think the idea that a building should be explicit is a false notion that reduces architecture to banality.

hand vs computer.

Of course, what would we be without computers?

Our entire practice relies on computing.

But a computer shouldn't just be a hand glove. In fact, hands should be the driving force behind computing power.

Because I believe there is a source in all the primitive, physiologically obscure parts of the hand, even though the source is unknown, and there is no need to be mystical about it.

We realize that hand was given to us by a power beyond our own autonomy.

And when I draw a drawing that might mimic a computer but is not a computer drawing—a drawing that comes from a completely unknown, unusual, unseen source—I think to all of you who actually work, how do we make the computer respond to our hands instead of the computer responding to our hands?

I think that's part of the complexity of architecture.

Sure, we're used to the propaganda that simple is better. But I don't believe it.

Listening to you, I am overwhelmed by the complexity of thought, the complexity of layers of meaning.

And I don't think we should shy away from architecture, as you know, neurosurgery, atomic theory, genetics, economics are complex and complicated fields.

There is no reason why architecture should shy away from presenting this simple fantasy world.

it's complicated. Space is complicated.

The universe is something that folds itself into a whole new world.

And, as amazing as it is, it cannot be reduced to the kind of simplification we have come to admire.

Yet our lives are complicated.

Our emotions are complicated.

Our intellectual needs are complex.

Therefore, I believe that the architecture I think of should reflect that complexity in every space, every intimacy we have.

Of course, that means architecture is political.

Politics is not the enemy of architecture.

Politima is the city. It's with us all.

And I've always believed that the act of architecture, even if it's a private house, is a political act when it's visible to others.

And we live in an increasingly connected world.

Again, that kind of pure architecture, an escape from the peculiar realm of autonomous architecture that is just an abstract object, never appealed to me.

And I believe that the interaction of history, and history, which is often very difficult, allows us to tackle it, to generate positions and critiques beyond our usual expectations.

Architecture is also about asking questions.

Don't just give the answer.

It's as much about asking questions as it is about life.

Therefore it is important that it is authentic.

You know you can simulate almost anything.

But the only thing that can be simulated is the human mind, the human soul.

And because we are born somewhere and die somewhere, architecture is inextricably intertwined with architecture.

In other words, architectural reality is intuitive. it is not intelligent.

It doesn't come from books or theories.

What we are touching is reality - doors, windows, thresholds, beds - such mundane objects. Yet, in every building, I try to create something very enigmatic and rich in virtual worlds in the real world.

Spaces for offices, creating sustainable spaces that actually work in between virtual reality and can be brought to life.

The unexpected and the habitual.

What are Habits? It's just a shackle for us.

It is a self-induced poison.

So the unexpected is always the unexpected.

Indeed, cathedrals are always unexpected, as they are unexpected.

Frank Gehry's architecture, as we all know, will continue to be unexpected.

That is, not habitual architecture that instills in us a false sense of stability, but architecture that is full of tension, architecture that goes beyond itself to reach the human soul and the human mind, breaking free from the shackles of habit.

And of course customs are enforced by architecture.

When we look at the same kind of architecture, we are immersed in a world of angles, light and materials.

We think the world is actually like our building.

But our buildings are quite limited by the technology and wonders of which they are a part.

Again, the unexpected is raw too.

And I often think about the raw and the sophisticated.

What is Raw? Raw, I would say, the unsophisticated, naked experience we associate with high culture, untouched by luxury and expensive materials.

So, I think, the fact that rawness, sustainability in the universe could actually translate in the future into raw space, undecorated space, undecorated by any source, but possibly cooler in terms of temperature, might be a refractor of our desires.

Spaces that don't always follow us like dogs trained to follow us, moving forward in the direction of demonstrating other possibilities and other experiences that were never part of architecture's vocabulary.

And of course that juxtaposition is very interesting to me because it creates a kind of new spark of energy.

So I like things that are edgy rather than blunt, things that focus on reality, and things that have the power to change even the tiniest of spaces with their leverage.

So while architecture may not be as big of a science as it is, through its focus it can tap into what we think the world really is in an Archimedean way.

And in many cases, it takes just one building to change our experience of what can be done, what has been done, and how the world remains stuck between stability and instability.

And of course the building has a shape.

It's hard to change their shape.

Yet, in every social space, every public space, I believe there is a desire to convey something more than just straight thinking and straight technique, something that can be pinpointed in various directions forward, backward, sideways and around.

So that's exactly what memory is.

Therefore, I consider my main interest to be memory.

Without memory, we would be amnesiac.

We won't know which way we're going, or why we're going.

So, of course, I wasn't interested in forgettable reuse, or replaying the same thing over and over again. Of course, it gets praise from critics.

Critics like the same performance repeated over and over again.

But I prefer to play something completely unprecedented, albeit flawed, than to repeat the same thing over and over hollowed out by meaninglessness.

Again, memory is the city, memory is the world.

Without memory, there would be no story to tell.

You will have nowhere to turn.

I think what is memorable is actually our world, what we think the world is.

And it's not just our memories, it's also those who remember us. In other words, architecture is not silent.

It's the art of communication.

it tells a story. The story can reach vague desires.

You may reach sources that are not explicitly available.

It can reach people who have been buried for thousands of years and bring them back with fair and unexpected fairness.

Again, the idea that the best architecture is silent never appealed to me.

Silence may be good for graveyards, but bad for cities.

A city should be full of vibrations, sounds and music.

And that is the mission of architecture, which I believe is important: to create vibrant, pluralistic spaces that can transform the most mundane of activities and elevate them to entirely different expectations.

Make shopping centers and swimming pools more museum-like than entertainment.

And these are our dreams.

And of course the risks. I think architecture should be risky.

You know it costs a lot of money and stuff, but you shouldn't play it safe.

You shouldn't play it safe. Because playing it safe doesn't move us in the direction we want to be.

And of course, I think there is risk at the bottom of the world.

A world without risk is not worth living in.

Yes, I believe in taking risks in every building.

The risk of creating a space that has never been cantilevered before.

Unprecedented spatial risks, understandably for pioneer cities.

The risk of making architecture, with all its imperfections, truly move into a space that is far superior to the ready-made cavities that are repeated over and over again.

And of course that's what I ultimately believe architecture is.

It's about space. It's not about fashion.

It's not about decoration.

It is about creating, with minimal means, something that cannot be replicated or simulated in other realms.

And, of course, there is the space we need to breathe, the space we need to dream.

These spaces are not just luxury spaces for some, they are important spaces for everyone in the world.

Again, it's not about changing fads or changing theory.

Clearing space for planting trees.

It carves out a space where nature can enter the homely world of the city.

A space where things that have never seen the light of day can enter the inner workings of density.

And I think that's the essence of architecture.

Now I believe in democracy.

I don't like beautiful buildings built for totalitarian regimes.

People can't speak, they can't vote, they can't do anything.

We often admire those buildings too. we think they are beautiful.

Still, I cannot admire those buildings, given the poverty of society that does not give people freedom.

So even though democracy is hard, I believe in it.

And of course, what else is there at Ground Zero?

It's a very complicated project.

Emotional, isn't it? I have many interests.

it's political. There are many stakeholders involved in this project.

I have many interests. I have money I have political power.

There are feelings of victims.

Yet, in all that confusion and all that difficulty, I didn't want anyone to say, 'This is Tabla Rasa, architect, do as you like.'

I don't think anything good will come out of it.

I think that consensus is important in architecture.

And it's about the dirty word "compromise". Compromise is not a bad thing.

If it's artistic, you can compromise if you can deal with that strategy. And here are my first sketches and final renders, and it's not too far off.

Still, compromise, agreement, that's what I believe.

And Ground Zero is moving forward despite all the difficulties.

it's difficult. 2011, 2013. Freedom Tower, monument.

That's it.

I was inspired when I came here as an immigrant on a boat like millions of other people and looked at America from that perspective.

This is America. This is free.

This is what we dream of. Its individuality is demonstrated in the skyline. It's resilience.

And finally, it's the freedom that America represents, not just for me as an immigrant, but for everyone in the world. thank you.

(Applause) Chris Anderson: I have a question.

So have you calmed down about the process that happened at ground zero and the loss of the original brilliant design you came up with?

Daniel Libeskind: Look. We have to fix the idea that we are authoritarians and can decide everything that happens.

We need to rely on others to shape the process in the best possible way.

I'm from the Bronx. I was taught not to be a loser, not to be someone who just gives up in a fight.

You have to fight for what you believe in. You can't always win everything you want to win. But you can control the process.

And I believe that what is built at Ground Zero will be meaningful, inspiring, and a reminder to other generations of the victims and the significance of this event.

Not just for New York, but for the world.

Chris Anderson: Thank you very much, Daniel Libeskind.

(applause)

Well, like Alexander Graham Bell famously said in his first successful phone call, "Hello, is that Domino's Pizza?"

(Laughs) I really have nothing but gratitude.

Another celebrity, Jerry Garcia, said: "What a strange, long journey."

And he should have said, "What a strange and long journey."

Right now, you're looking at my upper body.

My lower body is attending another conference in another country (laughs).

In fact, you can even be in two places at the same time.

Still, it's a pity that I can't join you directly.

I will explain on another occasion.

And even though I'm a rock star, I want to assure you that hot tubs are not among my wishes.

But it's not just the availability of more songs on MP3 players that really fascinates me when it comes to technology.

The revolution, this revolution, is much bigger than that.

I hope, I believe.

What intrigues me and personally excites me about the digital age is the closing of the gap between dreaming and doing.

You know, back in the day, if you wanted to make a record of your songs, you needed a studio and a producer.

Well, I need a laptop.

If you wanted to make a movie, you needed a lot of equipment and a Hollywood budget.

Now, you'll need a camera that fits in the palm of your hand and a blank DVD for a few bucks.

Imagination has been detached from old constraints.

And it gets really, really excited.

It's exciting to see a glimpse of such big thinking.

What I want is idealism, detached from all constraints.

Politics, economics, psychology, whatever.

The geopolitical world has much to learn from the digital world.

From how easily you brushed off an obstacle that no one could even get around.

And that is what I want to talk about today.

But first, I think I should explain why and how I got to this place.

A journey that began 20 years ago.

You may remember the songs "We Are The World" and "Do They Know It's Christmas?"

Band-Aid, Live-Aid.

Another tall, grizzled rock star, my friend Sir Bob Geldof, has announced a challenge to "feed the world."

It was a great moment and it completely changed my life.

My wife Ali and I went to Ethiopia that summer.

We went quietly to see for ourselves what was happening.

We lived in Ethiopia for a month and worked in an orphanage.

The children gave me names.

They called me "bearded girl".

(laughs) Please don't ask.

Anyway, I found Africa to be a magical place.

Big sky, big heart, big shining continent.

Beautiful, royal people.

People who donate something to Africa have gotten more in return.

Ethiopia not only blew my mind. It opened my heart.

Anyway, on my last day at this orphanage, a man handed me a baby and said, "Will you take my son?"

He knew that in Ireland his son would live and in Ethiopia his son would die.

It was in the middle of that terrible famine.

Well, I turned him down.

Funny enough, I turned him down.

And it's a feeling that can never be forgotten.

And in that moment I started this journey.

In that moment, I was at my worst. I've become a rock star with a cause. (Laughter) Isn't that the reason?

AIDS, a preventable and treatable disease, kills 65,000 Africans every day due to the lack of drugs available in pharmacies everywhere.

It's not the cause. It's an emergency.

There are 11 million AIDS orphans in Africa, rising to 20 million by the end of 2010.

It's not the cause. It's an emergency.

Today, stigma and lack of education will result in 9,000 more Africans becoming infected with HIV every day.

It's not the cause. It's an emergency.

So what we are talking about here is human rights.

Right to live like a human being.

Right to life, yes.

And what we face in Africa is an unprecedented threat to human dignity and equality.

The next thing I want to clarify is what this problem is and what this problem is not.

Because this is not all charity work.

This is about justice. TRUE.

This is not about charity. This is about justice.

That is correct.

It's a shame because we are good at charity work.

The Americans are just as good at it as the Irish are.

Even the poorest areas give more than they can afford.

We love to give and we give a lot.

Look at the reaction to the tsunami. It's inspiring.

But justice is a stricter standard than charity.

Africa makes fun of our concept of justice.

It farces our idea of ​​equality.

It mocks our piety. That makes us question our concerns.

It calls into question our commitments.

Because, looking at what's happening in Africa, I honestly can't conclude that the same thing would be allowed to happen anywhere else.

Not here but elsewhere, as heard in the movie.

Not here, not in America, not in Europe.

In fact, the head of state you know very well has admitted this to me. And it's really true.

Such a bleed of life is unlikely to be accepted anywhere outside of Africa.

Africa is a continent on fire.

And deep down, if we truly acknowledged that Africans are equal to us, we would all try harder to put out the fire.

We stand with watering cans when what we really need is a fire brigade.

Not as dramatic as a tsunami.

It's really crazy when you think about it.

Does it have to look like an action movie to exist in front of our brains these days?

The slow disappearance of countless lives just doesn't seem dramatic enough.

The catastrophes we can avoid are not as interesting as the catastrophes we can avoid.

It's funny.

Anyway, I believe such thinking undermines the intellectual rigor of this room.

65,000 deaths a day in Africa may be an African crisis, but the fact that it is not on the nightly news, the fact that we in Europe and you in America are not treating it like an emergency, I would like to argue with you tonight that it is our crisis.

My point is that while Africa is not on the front lines of the fight against terrorism, it could soon become so.

Every week, religious extremists take over another African village.

They are trying to bring order to chaos.

So why not?

Poverty breeds despair. we know this

Desperation breeds violence. we know this

In turbulent times, isn't it cheaper and wiser to make friends from potential enemies than to protect yourself from them later?

“The fight against terrorism is linked to the fight against poverty.”

And I didn't say that. Colin Powell said so.

Now that the military is telling us that this is a war that cannot be won by force alone, maybe we should listen.

There is an opportunity here, and it's a reality.

It's not spin. It's not wishful thinking.

The problems facing developing countries give us, as developed countries, an opportunity to redefine ourselves to the world.

Not only will we change other people's lives, but we will also change the way other lives see us.

And in this nervous and dangerous time, that may be wise.

On a purely commercial level, don't you think that antiretroviral drugs would be a great showcase for Western ingenuity and technology?

Doesn't compassion sound good to us?

Let's stop talking for a moment.

In certain regions of the world, Brand EU and Brand USA shine the least.

The neon sign is crackling.

Someone put a brick in the window.

The local branch managers are nervous.

Never before have we in the West been under such scrutiny.

OUR VALUES: HAVE ANYTHING?

our credibility?

They are under attack all over the world.

Brand USA may require some polishing.

And I say that as a fan, you know?

as a purchaser of goods.

But think about it.

It makes sense to increase antiretroviral drugs.

But that's just the easy part, or it should be.

But giving Africa equality is a big and expensive idea.

As you know, the magnitude of suffering paralyzes us into a kind of indifference.

What can we do about this?

Well, much more than we think.

I would argue that we cannot solve all problems, but we must solve those that we can.

And since we can, we must.

This is the straight truth, the correct truth.

It's not a theory.

In fact, our generation is the first generation to face disease and extreme poverty, look across the sea to Africa, and say this and say it for real. We don't have to endorse this.

Entire continents will be wiped out – we don't need to support this.

(Applause.) Before I endorse the ex-hippies, let me say this without a hint of sarcasm.

Forget the 60's. we can change the world.

I can't; I personally can't. But we can change the world.

People in this room, I believe so.

Look at the Gates Foundation.

They did the unbelievable, the unbelievable.

But together, we can actually change the world.

We can change the inevitable consequences and change the quality of life for millions of people who look and feel just like us by seeing it up close.

Sorry for laughing here, but you look a lot different than when you were at Haight-Ashbury in the 60's.

(Laughter.) But I would argue that this is the moment you were designed for.

Seeds planted earlier will flower.

Ideas that came to you when you were young.

This excites me.

This room was born for this moment, that's what I want to tell you tonight.

Most of you started out wanting to change the world, right?

In the digital world, most people have.

Well, in fact, thanks to you, it is possible to change the physical world.

It's true.

Economists also admit it, they know a lot more than I do.

So why don't we raise our fists in the air?

Probably because when you admit you can do something about it, you have to do something about it.

My butt hurts.

This equality business is really messy.

But for the first time in history, we have technology. we have the know-how. we have cash We have life-saving drugs.

Do we have the will?

I hope this is clear, I am not a hippie.

And I don't like the feeling of being too warm and fluffy.

I don't have flowers in my hair.

Actually, I'm from punk rock.

Crash was wearing big army boots instead of sandals.

But you can see how tough it is.

There was a lot of talk about peace and love on the West Coast, but the movement that started here was powerful.

You know, idealism disconnected from action is just a dream.

But idealism combined with realism, rolling up your sleeves and bending the world a little bit is very exciting. Very real. Very strong.

And it is very present in crowds like yours.

Last year, DATA, an organization I helped launch, launched a campaign to invoke this spirit in the fight against AIDS and extreme poverty.

We call this the ONE campaign.

It is based on our belief that the actions of one person can make a big difference, but the actions of many, united, can change the world.

Well, we feel it's time to prove ourselves right.

There are moments in history when civilization redefines itself.

We believe this is one of them.

We believe the time may come when the world will finally decide that the unjustified loss of life in Africa can no longer be tolerated.

It may be time for us to finally get serious about changing the future of most people on our planet.

It's gaining momentum.

A little wobbly, but built.

This is a year of testing for the leaders of the G8 nations, who are risking their lives right here in the eyes of all of us, especially the entire world in history.

I am disappointed with the Bush administration these days.

They set out with such a promise regarding Africa.

They have made some really great promises and have actually delivered on many of them.

But some people don't.

The truth is that they feel no pressure from the ground.

But when I talk to Americans, my disappointment is put in a much larger perspective, and I hear concerns about their country's fiscal deficits and fiscal health.

I know that.

But when we are organized, there is a lot more pressure from the ground than you might think.

What I am trying to convey is that aid to Africa is very good value for money when America really needs it.

To put it in the roughest terms possible, this investment pays off enormously.

Not only are lives saved, but goodwill, stability, and safety are also gained.

So if I can muster up the courage and not take it down from my wish count, I hope you do this.

(Laughter.) What I want is to go beyond individual acts of mercy to tell politicians to do what is right by Africa, by America, and by the world.

If you want, give them permission to use their political and financial capital, the national purse to save millions of lives.

That's what I really want you to do.

Because we also need your intellectual capital: your ideas, your skills and your ingenuity.

And you are in a unique position at this conference.

Some of the technologies we've talked about so far have been invented by you, or at least revolutionized how they're used.

Together you have transformed the zeitgeist from analog to digital and pushed the boundaries.

And we want you to give us that energy.

Give us such dreams, such deeds.

As I said earlier, there are two things at stake here.

It is the continent of Africa.

But we also have our own senses.

People are beginning to understand this.

Movement is becoming active.

Artists, politicians, pop stars, clerics, CEOs, NGOs, mothers' unions, student unions.

Many people have gathered and are working under the umbrella of the “ONE campaign” that I mentioned earlier.

I think they only have one thought in their head. It means that where you live in the world shouldn't determine whether you live in it.

(Applause.) History, like God, watches our actions.

I believe that when history books are written, our time will be remembered for three things.

In fact, there are only three things I remember from this entire era.

Digital revolution, yes.

War on terror, yes.

And what we did or didn't do to put out the fires in Africa.

Some say they can't afford it. I say it cannot be helped.

Thank you thank you.

(Applause) Yes, I have three wishes.

TED has offered permission.

You see, this is true, and I believe it is, but if the digital worlds you have created have separated your creative imagination from the physical constraints of matter, then this is very upsetting.

(Laughter) I should add that this started out as a much longer list of wishes.

Most of them are impossible, some of them are impractical, and one or two of them are definitely immoral.

(Laughter) This business becomes more addictive when someone else is picking up the tab.

Anyway, here is number one.

We ask that you help build a social movement of over one million American activists for Africa.

That is my first wish.

I believe it is possible.

A few minutes ago I told you about all the civic movements that are bubbling up.

You know, there are a lot of them out there.

And with this one campaign as an umbrella, my organization, DATA, and other groups have harnessed the energy and enthusiasm that spreads from Hollywood to the heart of America.

We know we have more than enough energy to propel this movement forward.

I need your help to make it happen.

Church America, Corporate America, Microsoft America, Apple America, Coke America, Pepsi America, Geek America, Loud America, we want to bring you all together here.

We can't just keep calm and leave this issue alone.

If we build a movement with the power of one million Americans, I believe we will not be denied.

We will listen to Congress.

We will be on the first page of Condi Rice's briefing book and enter directly into the Oval Office.

If there were a million Americans, and I really know that, if there was someone ready to make a phone call, ready to use an email, I am absolutely convinced that we could actually change the course of history on the African continent, literally.

Anyway, I would like to ask for your help in registering.

I know John Gage and Sun Microsystems are already on board with this plan, but there are a lot of people I'd like to talk to.

Yes, my second wish, number two.

I wish one media hit every single person on the planet living on less than $1 a day.

This equates to 1 billion media hits.

Google may have it, AOL may have it too.

Steve Case, Larry, Sergey -- they've already accomplished a lot.

It could be NBC. It could be ABC.

I'm actually talking about the Oscars on ABC today.

There is a film produced by John Kamen of Radical Media.

But you know, we need time to air ideas.

you have to do the math. We need to inform the American public of the statistics.

I truly believe in Truman's old line that if you tell the American people the truth, they will do the right thing.

And one more thing, this is not Sally Struthers.

It must be said that this is not a burden, but an adventure.

(Video): One by one they step forward and nurses, teachers, housewives and lives are saved.

The problem is huge.

One person dies every three seconds.

3 seconds, 1 second.

In parts of Africa, Asia, and even America, the situation is so desperate that aid organizations are coming together and acting in concert, just as they did during the tsunami.

We can overcome extreme poverty, hunger and AIDS.

But we need your help.

Another person, letter, voice will make the difference between life and death for millions.

Please join us as we work together.

Americans have an unprecedented opportunity.

we can make history.

We can start making history of poverty.

One by one, one by one.

Visit ONE at this address.

We are not looking for your money. I want your voice

Bono: Okay. By connecting all hospitals, clinics and schools in one African country, I hope TED truly demonstrates the power of information, the power to rewrite rules and change lives.

And I want it to be Ethiopia.

I believe that all schools, all clinics and all hospitals in Ethiopia can be connected to the internet.

That's my wish, my third wish.

I think it is possible.

I think we have the money and the brains to do it.

And it will be an amazing wish that you wish to fulfill.

As I said earlier, I have been to Ethiopia.

In fact, that's where it all started for me.

The idea that the Internet, which has changed all of our lives, can change a country, even a continent, that has barely progressed to analog, let alone digital, blows my mind.

But it didn't start out that way.

The first long-distance line from Boston to New York was used by telephone in 1885.

It was only nine years later that Addis Ababa and Harare, 500 kilometers away, were connected by telephone.

Since then, not much has changed.

In fact, the average waiting time to get a landline phone in Ethiopia is about 7-8 years.

But wireless technology was not even a dream at the time.

Anyway, I'm Irish, so you know how important speaking is.

Communication is very important for Ethiopia and it will change the country.

Nurses will be better trained, pharmacists will be able to order supplies, and doctors will share their expertise on all aspects of healthcare.

It's a very good idea to wire them up.

That's my third and final wish at the TED conference.

Thank you very much again.

(applause)

Charles and Ray were a team. they were a couple.

Despite The New York Times and Vanity Fair doing their best these days, they're not brothers. (laughs) And it was a lot of fun.

As you know, it was Ray who wore the ampersand in the family.

(Laughter) Today is Charles' 100th birthday, so let's focus on Charles.

But when I talk about him, I'm really talking about the two of them as a team.

This is when Charles was 3 years old. In other words, he will be 100 years old in June of this year.

We are planning to have many wonderful celebrations.

The key to their work is that most people come to the furniture door. You'll probably recognize this chair and some of the others I'm about to show you.

But we first enter through the Big Top door.

But the point about this is why I'm showing it.

Is it because Charles and Ray made this movie?

Actually, this is a training film for a clown vocational school.

They were also performing clown acts when the future of furniture wasn't as lucky as they thought.

I have a picture of Charles. Now let's take a look at the following clip.

The movie we are going to see is the one they made for the Moscow World Exposition.

Video: This is land.

There are many contrasts.

It is rough and flat.

It's cold in some places.

It's hot in some parts.

Too much rain in some areas, not enough in others.

But this land is inhabited.

And, as in Russia, they gravitate towards towns and cities.

Here is a glimpse of their way of life.

Eames Demetrios: Well, this is a movie that was barely seen in America.

It was divided into 7 screens and 200 feet wide.

And it was in the middle of the Cold War.

The Nixon-Khrushchev kitchen debate happened about 50 feet from where it aired.

But how did it all start?

You see, in common, the first line of Charles' narration was, "The same star that illuminates Russia illuminates the United States. From the sky, our cities look much the same."

It was the human connection that Charles and Ray always looked for in everything.

As you can imagine, they believed that the human mind could handle this many images, because the key was to have a gestalt understanding of what the images were about.

The above was a small excerpt.

But what can be said about Charles and Ray is that they always worked as models.

They were always trying things out.

One of the things I am passionate about is my grandparents' work and I am also passionate about my work, but in addition I am passionate about the overall vision of design, where design is a life skill rather than a professional skill.

And you know, those of us who have kids often want them to learn music.

I am no exception.

But that doesn't mean they'll be Bono or Tracy Chapman.

It's about getting music into their heads and their thoughts.

Design is no different. Design should be no different.

Here's a model of that seven-screen presentation.

And Charles is just checking there.

Now let's go through the furniture door.

This is a rare setting for an airport seat.

So what we're going to look at are some of the icons of Eames furniture.

And what's important about their furniture is that they said the designer's role is essentially that of a good host who anticipates the needs of their guests.

Cool image. But these are the ones I think are really cool.

These are all prototypes. These are mistakes, but I don't think mistakes are the right word for design.

It's a matter of trying to make it work better.

And some of them will probably make terrible chairs.

Some of them even look cool. It's like, "Hey, why didn't they try that?"

It was a hands-on, iterative process much like vernacular or folk design in traditional culture.

I think that is one of the commonalities between modernism and traditional design. I think that might be a real common denominator when thinking about what the hell we should be doing in the next 20 or 30 years.

Another cool thing about this is that when people say design in the media, they actually mean style.

I am here to talk about design.

But it turns out that the object is just a pivot.

It's the gist between process and system.

This is a little film I made about the making of the Eames Lounge Chair.

Charles and Ray's design process didn't end with manufacturing.

It continued. They were always trying to make things better.

Because that's what Bill Clinton said about Rwandan clinics.

Creating is not enough.

You have to create a system that works better and better.

That's why I liked this prototype photo so much.

For nothing more basic than that.

Try things out.

It is a relatively famous chair.

Early versions had an "X" base. That's what collectors like.

Charles and Ray liked this one because it was better.

"H" base and more practical.

This is called a splint.

And I was so impressed with Dean Kamen's work for the army and soldiers, as Charles and Ray designed the molded plywood splints. This is it.

They had done furniture work before.

But doing these splints taught me a lot about the manufacturing process, which is very important to them.

I'm trying to show too much because I want everyone to know so many ideas and images.

This is the house designed by Charles and Ray.

My sister is chasing someone else. that's not me

I wholeheartedly support the fact that he stole her diary, but it's not me.

And this is the movie on the bottom left, made by Charles and Ray.

Now look at that plastic chair.

This house is from 1949.

This chair was completed in 1949.

Charles and Ray, they weren't obsessed with style.

We didn't say, 'Our style is curvy.

We didn't say, 'Our style is lattice. Let's lattice our chairs.'

They focused on needs.

They tried to solve the design problem.

Charles used to say, "The degree to which you have a design style is how much you don't solve the design problem."

It's kind of a cruel quote.

This is the early design of the house.

And again, they were able to figure out how to make a prototype of the house. That is, architecture, a very expensive medium.

Here's the movie we're hearing rumors about.

"Powers of Ten" is a movie they made.

If you look at the clip below, you'll see the first version of "Powers of Ten" in the upper left.

The familiar one on the bottom right.

Mr. and Mrs. Eames' film Tops, bottom left.

And the lamp that Charles designed for the church.

Video: This belongs to a local group of galaxies.

These form part of a grouping system similar to stars.

They are so numerous and so diverse that from this distance they look like Earth's stars.

ED: You've seen that movie, but the great thing about this whole conference is that everyone is talking about scale.

Everyone here is working in a different way.

I would like to give an example.

E.O. Wilson once told me that when he observes ants — of course he loves them and wants to know more about them — he consciously looks at them in terms of scale.

So here are the little critters.

But just changing the framework of criteria reveals a lot, including what resulted in the TED Awards.

Modeling, they tried modeling all along. They were always modeling things.

And I think part of it is that they never delegated understanding.

And I think our family was very lucky. Because we learned about design backwards.

The design was no different.

It was part of life's work in general.

It was part of the quality of life.

And here are the family photos.

And you can see why I'm falling in style with a haircut like that.

Anyway, (laughs) I remember eating cut grapefruits at the Eames' house when I was a kid.

So go see another movie.

This is a movie called "Toys".

You can see me with the same hairstyle in the upper right corner.

The upper left is a movie taken with a toy train.

The bottom right is a toy that does nothing with solar.

Bottom left is a Day of the Dead toy.

Charles used to say that toys aren't as innocent as they look.

They often portend bigger things.

And the idea trained there of using materials honestly is exactly the same as using plywood materials honestly.

And now I'm going to test you.

This is a letter my grandfather sent my mother when she was five years old.

So can you read?

Lucia Angel, okay, eyes.

Audience: I saw a lot of trains.

ED: Kiri-san, it's nice to have a leatherworkers guild here too.

Also what is he doing? Paddle, paddle.

Sun? No, is there another name for sunrise?

Don, it was great.

I also rode I ...

AUDIENCE: I hope so, I hope so -- ED: If you ever visited the website Dogs of St. Louis in the late 1930s, you knew it was a Great Dane.

I hope you enjoy it. AUDIENCE: It was a good time -- ED: It's time

Citizen Kane, Roses -- AUDIENCE: Rosebuds.

ED: No, Tsubomi. "D" is. At Buddies -- AUDIENCE: Party. Love.

ED: Okay, good.

So, "I saw and rode a lot of trains.

We hope you had a great time at Buddy's party. ”

So you guys did pretty well, cool.

My mom and Charles had a great relationship with each other passing things like that back and forth.

It's all part of what they used to say: "Take pleasure seriously."

These are some images from my project called Kymaerica.

It's a kind of alternate world.

It is a kind of landscape reinterpretation.

These plaques are the plaques we have installed throughout North America.

Next week we have six shows in the UK.

And they respect events in the linear world from the fictional world.

Of course, since it's bronze, it has to be true.

Video: Cymerica with Waterfalls, Rolling Among Us -- ED: This is one of the traditional Cymerica songs.

So Paris, Illinois also had spelling bees.

Video: Your Word is N. Carolina.

女の子：Y-I-N-D-I-A-N-A。

ED: And Embassy Row is actually a historic site. Because in the story of Cymerica, this is where the Parisian Diaspora began and where the embassy was located.

You can actually visit and experience this 3D imaginary experience there.

And the town has really embraced it.

We collaborated with the Gwomeus Club to host a Spelling Bee.

But what's really cool is that we see the visual environment as inevitable. And it's not.

Other things could have happened. If you're Japanese, you might have discovered Monterey.

And we could have been born 100,000 years ago.

And lots of fun. This is the Bench Museum.

There are trading cards and all sorts of cool stuff.

And you are trapped in a kind of Kymaerica texture.

Great road building culture, Tahat Chave.

A man named Nobu Naga, called Japan's Columbus.

But now I will bring you back to the real world.

And here is Cranbrook. This is the first film that Charles made.

So let's take a look at it. no one has seen it.

Cranbrook has been very generous and has shown it here for the first time.

This is a movie about Maya Gretel, a famous potter and teacher at Cranbrook University.

And he made it for the 1939 Teachers' Exhibition.

Calm down. No track yet.

It's very simple. It's just the beginning. But it's something you learn by doing.

Want to learn how to make movies? Let's go make a movie.

And you try something.

But here's where it gets really cool.

Can you see the chair over there? The orange one? It's an organic chair. 1940.

He was making this movie at the same time Charles was making that chair.

So what I'm trying to say is that the scope of this vision, the overall vision of the design, was with them from the beginning.

It wasn't like, "Oh, I made a chair and it worked."

We are going to shoot some movies from now on. ”

It has always been part of their view of the world. And that's really powerful.

And I think it's not just about doing one thing when all of us in this room move design forward.

It's how you approach the problem. And there is a great and beautiful commonality between design, business and the world.

Now let's create the final clip.

I showed you some of the images. Now I want to focus only on sound.

This is Charles' voice.

Charles Eames: In India, casteless people and people of the lowest caste eat very often, especially in South India, on banana leaves.

And those with slightly larger scales eat something like a ceramic dish baked at a low temperature.

And a little further up is why the thing they call a thali is glazed.

If you want to raise the scale a little more, we recommend a brass thali.

And then things get a little dubious.

There are also things like silver-plated talis.

And then there are the sterling silver Talis.

And I think some nut somewhere ate the golden thali.

But you can go beyond that.

And those with some knowledge and understanding, not just the means, take the next step and eat banana leaves.

And in this age of us stepping back and regrouping, somehow I think the banana leaf parable has come to work. Because I'm not ready to say that the banana leaf eaten by one is the same banana leaf eaten by the other.

But it is that process that takes place in humans that transforms the banana leaf.

ED: I was looking forward to sharing that quote with you.

Because that's part of what we have to reach.

And I would like to share this too.

“The age beyond the information age is the age of choice.”

And I really think that's where we are.

And it's kind of cool to me to be part of the family and tradition that he was talking about in 1978.

One of the reasons why this matters and everything we do is that these are the ideas we need.

And I think this is all part of surrendering yourself to a design journey.

That's what we all have to do.

Design is no longer just for designers. it's a process. it's not the style.

You really need that good thinking to solve a very important problem.

Thank you very much for your time.

(applause)

Last year at TED, a project called Big Viz attempted to uncover the overwhelming complexity and richness of the conference experience.

Big Viz is a collection of 650 sketches created by two visual artists.

David Sibbet of The Grove and Kevin Richards of Autodesk created 650 sketches to capture the essence of each presenter's ideas.

And the unanimous opinion was that it worked really well.

These sketches brought to life important ideas, portraits and magical moments that we all experienced last year.

This year I thought, "Why does it work?"

Animation, graphics, illustrations, what creates meaning?

And this is an important question to ask yourself. Because I believe that the more we understand how our brains create meaning, the better we can communicate, think and collaborate better together.

So this year, let's visualize how the brain visualizes.

Cognitive psychologists say that the brain does not actually perceive the world as it is, but rather creates a series of mental models through a series of 'aha moments', or moments of discovery, through a variety of processes.

Of course, the process begins with the eyes.

Light enters, hits the back of the retina, circulates, and most of it flows into the rearmost primary visual cortex of the brain.

And the primary visual cortex perceives only simple geometry, the simplest shapes.

But it also acts like a sort of relay station that re-radiates and redirects information to many other parts of the brain.

There are 30 other parts that are optionally more meaningful, and more meaning is created through the "ahaha" experience.

We will only discuss three of them.

Therefore, the first one is called ventral flow.

It's on this side of the brain.

And this is the part of the brain that recognizes what something is.

It's a "what" detector.

look at your hands Look at your remote control. Chair. Book.

In other words, it is the part of the brain that is activated when you give something a word.

The second part of the brain is called the dorsal stream.

And what it does is locate the object within the physical body space.

So looking around the stage here creates a kind of mental map of the stage.

And if you close your eyes, you will be able to navigate it in your mind.

This will activate the dorsal flow.

The third part I want to talk about is the limbic system.

And this is deep in the brain. Evolutionarily very old.

And the feeling part.

It's a sort of gut center where you look at an image and say, "Oh, I have a strong or emotional reaction to what I'm looking at."

The combination of these processing centers therefore helps create meaning in very different ways.

So what can we learn about this? How can we apply this insight?

Again, the schematic is that our eyes visually judge what we see.

The brain does this in parallel, processing pieces of information asking a plethora of questions to create a unified mental model.

For example, looking at this image, a good graphic will move your eyes around and encourage you to selectively create visual logic.

In other words, the act of taking an interest in an image and looking at it creates meaning.

That's the selection logic.

Now, we have extended this to spatialize this information.

Many of you may remember the magic wall that worked with the Perceptive Pixel to create a literally infinite wall.

So you can compare and contrast big ideas.

Therefore, the act of compellingly creating interactive images enriches meaning.

Different parts of the brain are activated.

And the limbic system, which is activated when we see motion or color, is where the major shape and pattern detectors we've heard of before reside.

So what's the point of this?

We make meaning by looking, by the act of visual interrogation.

There are three lessons for us.

First, use images to clarify what you are trying to convey.

Then make these images interactive so they can be more fully engaged.

And third, it enhances memory by creating visual persistence.

These are techniques that can be applied to a wide range of problem solving.

The low-tech version looks like this:

By the way, inside Autodesk, in some organizations, in some departments, this is how we formulate and develop our strategy.

What we're literally doing is having the team paint the entire strategic plan on one giant wall.

And it's very powerful because everyone can see everything else.

There will always be room, a place, to understand all the elements of a strategic plan.

This is a time-lapse shot of the situation.

You can ask the question, "Who is your boss?"

You will understand. (Laughter) So the act of building images collectively and collaboratively transforms collaboration.

I didn't use powerpoint for 2 days.

But instead, the whole team creates a shared mental model that everyone can agree on and move forward with.

And this can be enhanced and enhanced by some new digital technologies.

And here is today's great announcement.

It's a set of emerging technologies that use large screen displays and do intelligent calculations in the background to make the invisible visible.

What we can do here is, quite literally, consider sustainability.

So the team can see and select all the key components that actually heat the structure and see the final result visualized on this screen.

So there are three things that make an image meaningful.

The first is to visualize and clarify your ideas.

Second, make it interactive.

And third, to sustain them.

And I believe that these three principles can be applied to solve some of the most difficult problems facing us in the world today. thanks so much.

(applause)

A gazelle with tuberculosis dies in the grasslands of Mauritania.

A carcass of an animal that has fallen near a small pool can become water-borne.

But for desert cleaners, this body is no problem. It's a feast.

Weighing up to 10 kilograms and with a wingspan of nearly 3 meters, the vulture is the undisputed king of carcasses.

This bird's powerful beak and strong neck easily tear through tough skin and muscle tissue, opening an entryway for weaker vultures.

This huge competition is too dangerous for the tiny Egyptian vulture.

With a wingspan of just 180 centimeters, this vulture uses thermal updrafts to stay aloft for hours at a time, making its way from its family nest in Portugal to Africa.

Upon arrival, however, he found himself near the bottom of the pecking order.

Fortunately, what he lacks in size, he makes up for in intelligence.

A short distance away I found an unguarded ostrich nest filled with huge but impenetrable eggs.

He uses a large stone to smash a single bird for its hard-earned food, but when the big bird is gone it will return to the gazelle.

Above the commotion is a Rappel Griffon Vulture.

At over 11,000 meters, this bird flies higher than any other animal.

Individual carcasses cannot be seen at this height.

But the sight of a fellow vulture leads them to feed.

The featherless head helps regulate the rapid temperature rise as it descends and keeps it clean as it tears apart decaying gazelles.

The carcass is peeled cleanly over several hours, well before the rotting flesh infects the water supply.

And tuberculosis cannot infect vultures.

These birds have evolved to have the lowest stomach pH in the animal kingdom, allowing them to digest diseased carrion and excreta without becoming ill.

In fact, mountain species such as bearded vultures have stomachs so acidic that they can digest most bones in just 24 hours.

This adaptation helps smaller vultures supplement their diet with feces, while larger vultures can eat diseased meat within the first three days of life.

Their acidic stomach also protects them from living animals. Their fetid vomit scares most predators.

These steel stomachs are essential for ridding African ecosystems of pathogens such as cholera, anthrax and rabies.

But while vultures can easily digest natural waste, man-made chemicals are another story.

Diclofenac, a veterinary drug commonly used to treat cattle in India, is lethal to vultures.

Meat hunters often eat carcasses of cows, as local religious beliefs prohibit the consumption of beef.

Since the 1990s, the drug has contributed to a 95% decline in vulture populations in the region, along with threats from power pylons and habitat loss.

In nearby Africa, carcasses are deliberately poisoned to prevent poachers from alerting authorities to their presence.

A single poisoned carcass can kill over 500 vultures.

More than 50% of all vulture species are currently threatened with extinction.

Carcasses take three times as long to rot in areas where vultures are extinct.

These carcasses contaminate drinking water, and stray dogs and rats introduce disease into human society.

The Asian and African vulture crises have sparked rabies epidemics in India, killing around 20,000 people each year.

Fortunately, some communities are already aware of the importance of vultures.

Conservationists have successfully banned drugs like diclofenac, and other researchers are working to revive vulture colonies through breeding programs.

In some areas, farmers have opened vulture restaurants where they safely dispose of drug-free livestock.

With help, vultures will be able to continue their role in protecting the health of the planet and turning death and decay into life.

In the 8th century AD, Vikings surged across the sea of ​​fog.

They came from Scandinavia, Northern Europe, but had traveled far.

Some looted and settled in the British Isles and France. Others have braved the Arctic expeditions and forged clever new trade routes to the Middle East.

With steely navigation, sophisticated longboats, and formidable tactics, the Vikings have been sailing for over 300 years.

However, in spite of their best efforts, they left few monuments.

Instead, stones, bark, and bone fragments are the keys to their culture.

Found in tombs, swamps, and ancient settlements, many of these objects are inscribed with Old Norse messages written in runes.

But the Vikings also carved runes on household items, jewelry, weapons, and even shoes.

Decoding these messages is not an easy task.

The runes are the short, straight diagonal lines that make up an alphabet called "futharks". People of all classes spoke and wrote the language in various dialects.

There was no standard spelling, and they wrote individual runes by pronouncing the sounds of regional accents.

Some of these inscriptions were also influenced by other cultures with which the Vikings interacted. For example, the runic inscription "Love conquers all" is originally a Latin phrase of the poet Virgil.

Like the enigmatic rock runestones, many are inscribed with poetry, highlighting the Old Norse poetic tradition.

So while modern Luno scholars can read the runes, their meaning is not always clear.

Although still a mystery, many inscriptions commemorating the dead and recording local history have been deciphered, some containing magical spells.

The runes of Ramsund, Sweden, are carved into a rock outcrop beside a bridge for travelers to pass through marshes.

This causeway was built by a prominent local woman named Sigrizul.

She proclaimed both her importance and her family's power by carving her family's name into stone, and even linked herself and her family to mythical heroes by carving an illustration of Sigurd the Dragonslayer.

Two 10th-century standing stones commemorate different generations of the royal family in the Danish town of Jelling.

The first was built by King Gorm the Elder in memory of his wife Tilvi, and the second was built after Gorm's death by his son Harald Bluetooth.

These stones testify to the power of this Viking Age dynasty and are one of Denmark's oldest historical documents.

They tell that Harald ruled over southern Norway and converted to Christianity, indicating that Denmark was the first major kingdom of the Viking age.

The Harald Bluetooth initials now make up the Bluetooth logo.

The 10th-century warrior-poet Egil was a famous rune sculptor.

According to poetic accounts, he once carved runes into poisoned horns, causing the horns to shatter.

In another story, Egil saved a young girl's life by placing a whalebone engraved with healing runes under her pillow.

Norse poetry tells of runic spells chanted to ensure calm seas, safe births and victorious battles.

However, the exact nature of these spells is not fully understood, and many of the inscriptions on swords, axes, and spears are illegible.

Other items, such as Lindholm's amulets, are inscribed with inscriptions that could be spells, riddles, or religious messages.

The exact end of the Viking Age is difficult to pinpoint, but by 1100 AD, maritime expansion was all but over.

However, people continued to speak Old Norse throughout Scandinavia. And the runes continued to be used in rural areas until the 19th century.

Today, many runestones remain in their original locations.

For millennia, the inscription on the Danish Gravendrup stone has proclaimed the dreadful proclamation: "Whoever harms this stone or drags it in memory of another is a wizard!"

A ragged woman emerges from a swamp surrounded by seven giant scorpions.

She carried the baby and went to the nearest village to beg for food.

She approached a fine mansion, but the mistress of the house took one look at her dirty clothes and unusual companions and slammed the door in her face.

So she continued on her way until she reached the hut.

The woman there took pity on the stranger and offered everything she could. It was a simple meal and a bed of straw.

Her customers were no ordinary beggars.

She was the most powerful Egyptian goddess Isis.

Isis murdered her husband and was hiding from her brother Set, who tried to kill her infant son Horus.

Seth, also a powerful god, was looking for them.

Therefore, in order to hide herself, Isis had to be very careful. She could not risk her power.

But she was not without help.

Serket, goddess of poisonous creatures, dispatched seven of her fiercest followers to protect Isis and her son.

When Isis and Horus settled into a modest lodging, the scorpions were furious at how the wealthy woman had offended their divine mistress.

They all mixed up the poison and gave it to one of the seven, Teffen.

In the middle of the night, Teffen sneaked into the mansion.

When he crawled under the door, he saw the owner's little son sleeping peacefully and stabbed him hard.

Isis and her mistress were soon awakened by loud crying.

Looking out from the doorway of the hut, I saw a mother running down the street, crying, holding her son in her arms.

When Isis recognized the woman who drove her away, she understood what the scorpion had done.

Isis took the boy in her arms and began chanting a powerful spell. "Get out of him and fall to the ground, O poison of Teffen!"

Venom of Befen, do not advance, do not invade any more, get out of him and fall to the ground!

For I am Isis, the great wizard and spellcaster.

Go down, poison of Mestedt! Hurry up, poison of Mestetev!

Don't get up, Petet and Tetet's poison! Stay away, Matet's Poison! ”

Each time she called her name, the scorpion's venom was neutralized.

When the child moved, the mother wept with gratitude, lamented her former ruthlessness, and gave all her possessions to Isis in repentance.

The woman who took Isis watched in awe. I had no idea who I had brought under my roof.

And from that day on, people learned how to make poultices when stung by scorpions, casting magic spells just like the goddesses.

A new drug reduces the risk of heart attack by 40%.

Shark attacks are doubled.

Drinking 1 liter of soda per day doubles your chances of developing cancer.

These are all examples of relative risk, a common way risk is presented in news articles.

Risk assessment is a complex web of statistical thinking and personal preferences.

One common stumbling block is the difference between this relative risk and what is called absolute risk.

Risk is the likelihood that an event will occur.

This can be expressed as a percentage (e.g., 11% of men aged 60-79 will have a heart attack) or 1 in 2 million divers on the west coast of Australia die from shark bites each year.

These numbers represent the absolute risk of heart attacks and shark attacks in these groups.

Change in risk can be expressed in relative or absolute terms.

For example, a 2009 review found that mammography screening reduced breast cancer deaths from 5 to 4 per 1,000 women.

The absolute risk reduction was about 0.1%.

However, the relative risk reduction from 5 cancer deaths to 4 is 20%.

Based on this higher number reported, people overestimated the impact of screening.

To understand why the difference between the two ways of expressing risk is important, consider the hypothetical example of a drug that reduces the risk of heart attack by 40%.

Imagine that in a group of 1,000 people who didn't take the new drug, 10 had a heart attack.

The absolute risk is 10 in 1,000, or 1%.

A similar group of 1,000 people taking the drug would have six heart attacks.

In other words, the drug could prevent 4 out of 10 heart attacks, reducing the relative risk by 40%.

On the other hand, although the absolute risk only dropped from 1% to 0.6%, the 40% reduction in relative risk seems much more significant.

Surely there's value in preventing a handful of heart attacks and other negative outcomes, right?

necessarily.

The problem is that choices that mitigate some risks can expose others.

Suppose a heart attack drug caused cancer in half of the 1% of patients.

In our group of 1,000 people, taking this drug would prevent 4 heart attacks, but 5 new cancers.

The relative reduction in heart attack risk sounds large, and the absolute cancer risk seems small, but they represent about the same number of cases.

In real life, an individual's assessment of risk will vary depending on individual circumstances.

If you know you have a family history of heart disease, you may be more motivated to take drugs that lower your risk of heart attack, even though the absolute risk reduction is small.

Sometimes you have to decide whether to expose yourself to risks that are not directly comparable.

For example, if a heart attack drug carries a higher risk of debilitating but not life-threatening side effects, such as migraines rather than cancer, the assessment of whether that risk is worth taking may change.

Also, the right choice does not always exist. Some people say that even a very small risk of a shark attack is worth avoiding because you're just going to miss swimming in the ocean, while others say the risk of a shark attack is objectively so small that you wouldn't even consider giving up swimming.

For all these reasons, baseline risk assessment is difficult and risk reporting can be misleading, especially when absolute and relative numbers are common.

Understanding how these measures work can help you avoid confusion and better assess risk.

At about 4:00 pm on July 20, 1969, humans were just minutes away from landing on the moon.

But before the astronauts could begin their final descent, an emergency alarm sounded.

Something was overloading the computer, threatening to abort the landing.

Margaret Hamilton returned to Earth and held her breath.

Having led the team that developed the pioneering in-flight software, she knew there was no room for error on this mission.

But the nature of this last-minute emergency means that her software will soon prove to be working as planned.

Born 33 years ago in Paoli, Indiana, Hamilton was always curious.

I studied mathematics and philosophy in college, then took a research job at the Massachusetts Institute of Technology to pay for graduate school.

Here she encountered her first computer while developing software to support new areas of research in chaos theory.

Next, at MIT's Lincoln Laboratory, Hamilton developed the software for America's first air defense system to search for enemy aircraft.

However, when she heard that famed engineer Charles Draper was looking for help sending humans to the moon, she quickly joined his team.

NASA turned to Draper and his group of over 400 engineers to invent the first compact digital flight computer, the Apollo Guidance Computer.

This device uses input from astronauts and is responsible for guiding, navigating and controlling the spacecraft.

At a time when unreliable computers filled an entire room, AGC had to work error-free and fit in a single cubic foot of space.

Draper split the lab into two teams, one to design the hardware and the other to develop the software.

Hamilton led the team that built the onboard flight software for both the Command Module and the Lunar Module.

The job she coined the term "software engineering" was incredibly high stakes.

Every program had to be perfect because lives were at stake.

Margaret's software had to detect unexpected errors quickly and recover in real time.

However, early software could only process jobs in a predetermined order, making this kind of adaptive program difficult to build.

To solve this problem, Margaret designed the program to be "asynchronous". This means that the software's more important jobs interrupt less important jobs.

Her team assigned every task its own priority, ensuring each job was done in the right order and at the right time, regardless of the unexpected.

After this breakthrough, Margaret realized that her software would also help astronauts work in an asynchronous environment.

She designed a priority display that interrupts astronauts' routine tasks to alert them to emergencies.

Astronauts can then communicate with Mission Control to determine the best path forward.

This was the first time the flight software communicated directly and asynchronously with the pilot.

It was these failsafes that sounded the alarm just before the moon landing.

Buzz Aldrin quickly realized his mistake. I accidentally pushed the rendezvous radar switch.

This radar is essential when returning home, but here it was using up important computational resources.

Fortunately, the Apollo guidance computers were well equipped to manage this.

During the overload, the software restart program allowed only the highest priority jobs to process, including programs required for landing.

A priority display gave the astronauts the choice to land or not.

With a few minutes to spare, the controller issued the order.

For the Apollo 11 landing, astronauts, mission control, software, and hardware all worked together as an integrated system.

Hamilton's contribution was essential to the work of engineers and scientists inspired by President John F. Kennedy's goal of reaching the moon.

And her life-saving work went well beyond Apollo 11. During the manned Apollo program, no bugs were found in the onboard software.

After his work at Apollo, Hamilton founded a company that created breakthroughs in systems and software using its own universal systems language.

In 2003, NASA honored her with the highest monetary award ever given to an individual.

And 47 years after her software brought the first astronauts to the moon, Hamilton was awarded the Presidential Medal of Freedom for changing the way we think about technology.

I usually teach courses on how to rebuild a post-war nation.

But today I would like to share a personal story with you.

This is a photo of my family, my mother and my four brothers, taken in 1977.

And we are actually Cambodians.

And this photo was taken in Vietnam.

So how did a Cambodian family end up in Vietnam in 1977?

To illustrate, we have prepared a short video clip describing the 1975-1979 Khmer Rouge regime.

Video: April 17, 1975.

The communist Khmer Rouge entered Phnom Penh to liberate its people from the encroaching Vietnam conflict and US bombing campaigns.

The Khmer Rouge, led by peasant-born Pol Pot, are evacuating people to the countryside to build a communist utopia in the countryside much like Mao's Cultural Revolution in China.

The Khmer Rouge has closed the door to the outside world.

But four years later, the cruel truth is revealed.

In a country of just seven million people, 1.5 million people were murdered by their own leaders and their bodies piled up in mass graves at the sites of the killings.

Sopar Yeh: So, despite the 1970s narration, on April 17, 1975, we were living in Phnom Penh.

And my parents were told by the Khmer Rouge to evacuate the city for three days due to imminent American bombing.

And here is a picture of the Khmer Rouge.

They were young soldiers, usually child soldiers.

And this is quite normal in modern conflicts, because it is easy to bring into war.

The reasons they mentioned for the American bombing weren't too far-fetched.

So from 1965 to 1973, more ammunition was dropped on Cambodia than on all of Japan during World War II, including two nuclear bombs in August 1945.

The Khmer Rouge did not believe in money.

So the equivalent of Cambodia's Federal Reserve Bank was bombed.

But not only that, they actually banned money.

I think this is the only precedent where the use of money has been stopped.

And while we know that money is the root of all evil, money has not really stopped what is happening in Cambodia.

My family moved from Phnom Penh to Pursat province.

Here is a picture of what the pursat looks like.

In fact, this is one of the most beautiful areas in Cambodia where rice is grown.

And in fact they were forced to work in the fields.

So my father and mother were put in a kind of concentration camp, a labor camp.

And at that time, my mother received word from the commune chief that the Vietnamese were actually asking the people to return to Vietnam.

And since she grew up with Vietnamese friends, she could speak a little bit of Vietnamese from an early age.

And she, despite the advice of her neighbors, decided to take a chance and claim to be Vietnamese so that we would have a chance of survival. Because at this time they are forcing everyone to work.

And I think the modern calorie-restricted diet feeds porridge with a few grains of rice.

Around this time, my father became seriously ill.

And he didn't speak Vietnamese.

So he actually died in January 1976.

And, in fact, it made it possible for us to carry out this plan.

So the Khmer Rouge took us from a place called Pursat to Khao Tief across the Vietnamese border.

And there was a concentration camp where Vietnamese suspects were examined and given language tests.

And my mother's Vietnamese was so bad that I gave all the boys and girls new Vietnamese names to add credibility to our story.

But she gave boys girl names and girls boys names.

Only after she told her about this and met a Vietnamese woman who coached her intensively for the next two days was she able to take the exam. And, you know, this was a moment of truth.

If she fails, we're all going to the gallows. If she passes, we can leave for Vietnam.

And she actually, of course, I'm here, she passes by.

Then you will arrive in Hong Ngu on the Vietnamese side.

And then to Chau Doc.

And here is today's photo of Hong Ngu, Vietnam.

Quite an idyllic place in the Mekong Delta.

But for us it meant freedom.

and freedom from persecution from the Khmer Rouge.

Last year, when the United Nations-backed Khmer Rouge Tribunal began in Cambodia, I decided that, for the record, I should bring a civil suit in court over my father's death.

And last month, I received word that this complaint was formally accepted by the Khmer Rouge Court.

For me, this is a matter of justice for history and a matter of accountability for the future. Because Cambodia can still be a pretty lawless place.

Five years ago my mother and I moved back to Chau Doc.

And she was able to return to a place that meant both freedom and fear to her because we had just come out of Cambodia.

I'm actually happy to introduce her today.

She is here with us today.

thanks Mom.

(applause)

So, about four or five years ago, I think, I was sitting on a stage in Philadelphia with a bag that looked like this.

And I was taking molecules out of this bag.

What I meant was that you don't know much about this molecule, but your body knows it.

We are so immune to this disease that at the time I thought maybe your body didn't like it. This is called the α-gal epitope.

And the fact that pig heart valves are loaded with these is the reason why pig heart valves cannot be easily transplanted into humans.

Our bodies don't really like them.

Our bodies love these. it eats them.

So the cells of our immune system are always hungry.

And if the antibody sticks to any of these on the cell, that means "it's food."

Well, I was thinking about it, and I said, you know, we have an immune response to this ridiculous molecule that we don't make, and it's common in other animals and stuff.

But I said you can't get rid of it, because all the people who have tried to transplant heart valves have found that you can't get rid of that immunity.

So I said, why not use it?

What if I could attach this molecule to a pathogenic bacterium that had just entered my lungs?

This means that an already existing immune response can be tapped immediately, taking less than 5-6 days to develop. The immune response will immediately attack whatever this is.

It was like when a police officer drops a bag of marijuana in the back of your car when you get a traffic ticket in Los Angeles and charges you with marijuana possession.

It's like a very quick and very efficient way to get people off the streets.

(Laughter) So, if you can actually take the bacteria that don't make any of these things, and you can get a hold of it, you can remove it from the city.

And for certain bacteria there is no longer a really efficient way to do that.

Antibiotics are running out.

And, I mean, the world is apparently running low, too.

So maybe 50 years from now it won't matter. Streptococci are prevalent. because we are not here. But if we were, (laughter) we would need something to do with bacteria.

So I started working on this with a lot of collaborators.

And it's trying to attach itself to what used to attach itself to a specific target zone: bacteria that we don't like.

And I feel like George Bush now.

It just feels like mission accomplished.

So maybe I'm just as stupid as he was back then.

But basically what I was talking about there is now what we're working on.

And it kills the bacteria. it is to eat them.

This could be stuck, like the little green triangle there, symbolizing the situation right now.

You can attach this to something called a DNA aptamer.

The DNA aptamer then specifically binds to the target of choice.

There you can find little features about bacteria you hate, such as staphylococci. I don't particularly like it. Because I killed my friend's professor last year.

Does not respond to antibiotics. That's why I hate it.

I am making an aptamer to attach this.

Then you'll know how to spot staphylococci in your body when they're present, alerting your immune system to go after them.

I will explain what happened. See that line of little dots at the top?

It's a swarm of rats poisoned with anthrax by a fellow scientist at Brooks Air Force Base in Texas.

And they were also being treated with drugs we made that specifically attack anthrax and direct the immune system to anthrax.

It turns out that everything at the top was alive. This is 100 percent survival.

And they actually lived another 14 days, and finally 28 days when we killed them and dismembered them to figure out what was wrong.

why didn't they die?

And they didn't die because the anthrax was gone.

That's why we did it. have understood?

(Applause) Mission complete!

(applause)

From what I'm about to say, I really need to establish an eco-friendly credential.

At an early age, as an American, I made a pledge to save our country's natural resources, air, soil, minerals, forests, water, and wildlife, and to faithfully protect them from waste.

And I've stuck with it.

At Stanford, I majored in ecology and evolution.

In 1968 I published the Whole Earth Catalog. For a time, it was "Mr. Natural."

After that, he worked in the Jerry Brown administration.

The Brown administration and many of my friends basically leveled California's energy efficiency so much that it's still there 30 years later, even though the economy has risen 80% per capita.

And it emits fewer greenhouse gases than any other state.

In this respect, California is basically the equivalent of Europe.

This year's Whole Earth Catalog has an appendix called Whole Earth Disciplines that we preview today.

A major demographic event of our time is this screamingly rapid urbanization that we are undergoing.

About 80% of our population will be urbanized by the middle of this century. It happens mainly in developing countries.

This is interesting because history depends a lot on the size of a city.

Developing countries now have all of the largest cities, growing three times faster than the developed world and nine times the size.

They are qualitatively different.

As history shows, they are the driving force of history.

1000 years ago the world was like this.

Well, we now have a distribution of urban power similar to that of 1,000 years ago.

In other words, the dramatic rise of the West is over.

The total number is just overwhelming. Ten years, ten years, 1.3 million people come to the city every week.

What is really going on?

Now, what is happening is that villages around the world are becoming empty houses.

Subsistence farming is basically dying out.

People are chasing opportunities and coming to town.

This is why.

I had a very romantic idea of ​​the village because I had never lived in one.

(Laughter.) Because in the streets -- this is the bustling squatter city of Kibera near Nairobi -- they're seeing action. they see an opportunity.

They see a cash economy that subsistence farms could not participate in.

You'll discover a lot of aesthetics when touring these places.

A lot is happening.

They are poor, but very urban. And they are very creative.

The current total is basically squatters, a total of 1 billion people building the urban world. So they build their world individually, family by family, clan by clan, neighborhood by neighborhood.

It's flimsy at first, but over time it becomes solid.

They also build their own infrastructure.

Well, first steal their own infrastructure.

Cable TV, water, everything is stolen.

And it will gradually become more sophisticated.

Slums don't hurt prosperity, working shantytowns don't hurt. They help generate prosperity.

So in a city like Mumbai, which is half slum, it's equivalent to one-sixth of India's GDP.

The social capital of slums is the most urban and dense.

These people are precious as a group.

That's how they work.

There are many people who think of all these poor people, "I'm in trouble. I need to fix their housing."

It used to be, "Oh, I have to get phone service."

Now they're showing us how they do their phone service.

Hunger is now largely a rural occurrence.

There are things they value.

This is where we can help.

And the countries they are in will help.

And they help each other to solve these problems.

And go to dense places like this slum in Mumbai.

Look in the right lane.

And you can ask, "So what's going on there?"

The answer is "everything".

This place is better than shopping malls. much denser.

much more interactive.

And the scale is amazing.

The key event is that they are not poverty-stricken people.

They are busy getting out of poverty as soon as possible.

They help each other with it.

They do it through the illegal economy, the illegal economy.

The informal economy is like dark energy in astrophysics. It shouldn't exist, but it's huge.

I still don't understand how it works, but I should.

Moreover, for those who belong to the informal economy, the gray economy, over time, crime will occur around them. And they can join the criminal world or they can join the legal world.

We need to make it easier for them to make the choice to head for the legal world. Because if they don't, they'll be heading into the criminal world.

There are all kinds of activities.

In Dharavi, the slums not only serve many services for themselves, they also serve the city as a whole.

And one of the major events is these temporary schools.

Parents pool their money to hire local teachers for a small, private, informal school.

Education becomes more possible in cities, and it changes the world.

There are some interesting, typical, urban ones.

One collided with another, like here in São Paulo.

That's what cities do. That's how you create value by hitting things against each other.

In this case, supply is right next to demand.

So the maids, gardeners and guards who live in the lively area on the left side of town walk to work through the boring and wealthy neighborhoods.

It's amazing how close they are.

We are learning how close proximity can get.

The city has an interesting way of doing things, so the connection between the city and the countryside is what keeps the country good.

This is what makes cities -- (applause) this is what makes cities in the developing world so green.

Because people are getting out of the poverty trap, the ecological disaster of subsistence farms, and heading to town.

And when they are gone, the natural environment begins to return rapidly.

And those remaining in the village can switch to cash crops to feed the town's new growing markets.

So if you want to save your village, you have to have good roads, or a good cell phone connection, and ideally a power grid.

So the event is: We are a city planet. That's what happened.

more than half.

There are quite a few of them. One billion people currently live in squattered cities.

An additional $1 billion is expected.

This means that more than one-sixth of mankind lives a certain life.

And it largely determines how we function.

Now, for us environmentalists, the greenest thing about cities might be that they spread population bombs.

People are coming into town.

You will soon have fewer children.

They don't even need to get rich yet. Merely having the opportunity to come out into the world means fewer quality children and a sharp drop in fertility rates.

There are some very interesting side effects here. This is Phillip Longman's slide.

Show what is going on.

There are more and more elderly people like me, and fewer and fewer babies.

And they are regionally segregated.

What you're getting at is a world of northern old men and old cities operating the old fashioned way.

And young people live and do new things in the brand new cities they have invented in the South.

Where do you think action will occur?

Topic shift. A quick stop depending on the weather.

Unfortunately, the climate news is going to get worse and worse faster than we think.

Climate is a highly complex nonlinear system, full of runaway positive feedbacks, hidden thresholds and irreversible tipping points.

Here are some samples.

We continue to be amazed. And almost all surprises will be bad.

From your point of view, this means a huge increase in climate change refugees in the coming decades, with accompanying resource and chaos wars like the one we are seeing in Darfur.

That's the drought.

It reduces capacity and doesn't have enough capacity to support people. And you are in trouble.

Move on to power status.

Baseload power is what you need to run a city or urban planet.

So far, there are only three sources of baseload power: coal, some gas, nuclear and hydro.

Of these, only nuclear and hydropower are green.

Coal is the cause of climate problems.

And until the government makes it expensive, everyone will keep burning it because it's too cheap.

Wind and solar won't help. Because there is currently no way to store that energy.

So if hydropower reaches its limits, coal may lose the climate, or nuclear power, the low-carbon source currently in operation, may save the climate.

And if we can finally get good solar power in space, that could help, too.

Because this is what drives the prosperity of villages and cities in developing countries.

So compare that waste between coal and nuclear.

If all the electricity you used in your lifetime was nuclear, the total amount of waste would fit in a can of Coke.

A typical 1 gigawatt coal-fired plant burns 80 rail cars (100 tons each) of coal per day.

And 18,000 tons of carbon dioxide are released into the air.

So when you compare the lifetime emissions of these different forms of energy, nuclear is about on par with solar and wind, above solar, sorry, hydro and wind, and above solar.

And will nuclear power really compete with coal?

Just ask the Australian miners.

There you see some of the sources, not from my fellow environmental activists, but from people who feel threatened by nuclear power.

The good news is that the developing world, and frankly the whole world, is busy building, and starting to build, nuclear reactors.

This is good for the atmosphere.

It's good for their prosperity.

I would like to point out one interesting thing. That is, environmentalists prefer something called micropower.

I don't know, but it should be local solar, wind, co-generation, or something better.

But frankly, the microreactors currently in operation could do even better.

The Russians who started this are building floating reactors for new shipping routes as ice in northern Russia melts.

And they sell only 35 megawatt floating reactors to developing countries.

This is an early Toshiba design.

For example, it's interesting to compare 25 megawatts, 25 million watts, to the standard Westinghouse and Arriba standard big irons (1.2 billion watts, 1.6 billion watts).

These things are much smaller. they are much more adaptable.

This is an American design by the Lawrence Livermore Institute.

This is also an American design that originated from Los Alamos and is now commercially available.

Nearly all of these are not only small, but have anti-diffusion capabilities.

It is usually buried in the ground.

And innovation is moving very quickly.

So I think microreactors will be important in the future.

In terms of proliferation, nuclear power has contributed more to dismantling nuclear weapons than any other activity.

So 10 percent of the electricity in this room, 20 percent of the electricity in this room is probably nuclear.

Half of that comes from dismantled warheads from Russia, and will soon be joined by our dismantled warheads.

Therefore, I hope that the GNEP program formulated by the Bush administration will be actively promoted.

And when President Obama spoke in Prague last week, I was pleased to see his support for a nuclear fuel bank strategy.

another subject. From my point of view as a biologist, there is no controversial reason for genetically engineered food crops.

My fellow environmentalists have made irrational, anti-scientific, and highly damaging statements on this issue.

Despite our best efforts, GM crops are the most rapidly successful agricultural innovation in history.

It is good for the environment because no-till farming is possible. No-till farming leaves the soil intact and healthy year after year. This reduces the emissions of carbon dioxide from the soil into the atmosphere.

They use less pesticides.

Yields also increase, so farmlands can be made smaller, freeing up more wild areas.

By the way, this 2006 map is outdated. Because it shows that Africa is still under the control of Greenpeace and European Friends of the Earth, and that they are finally coming out from under it.

And biotechnology is finally making rapid progress in Africa.

This is a moral issue.

The Nuffield Council on Bioethics has met at length on two occasions, stating that it is a moral imperative to make GM crops readily available.

Speaking of urgency, geoengineering is currently taboo, especially among government officials. I think there was a DARPA meeting a few weeks ago, but I'll leave that up to you to decide - not this year, but some time soon, as some hard realizations are happening.

Here is a list of them.

Basically, the news will get scarier and scarier.

Events such as the recent heat wave that killed 35,000 people will occur.

Like a cyclone approaching towards Bangladesh.

Like wars over water, such as the Indus.

As these events keep happening, we ask ourselves, "So what can we really do?"

But geoengineering has a small problem. What agency decides who becomes an engineer? How much do they do? where are they doing it?

Because everyone is downstream, downwind no matter what they do.

And if you make it completely taboo, civilization can be lost.

But if we say, "Okay, China, you're worried, go ahead."

You geoengineer your way. We will geoengineer our way. ”

It is considered an act of war for both countries.

So this is a very interesting diplomacy about to take place.

I must say it's more practical than people think.

This is one of dozens of geoengineering ideas, and a favorite among climatologists.

This is from sulfur dioxide ejected from Mount Pinatubo in 1991, cooling the Earth by half a degree.

The following year, 1992, the ice was so abundant that polar bear cubs, known as Pinatubo cubs, proliferated.

Putting sulfur dioxide in the stratosphere costs about $1 billion a year.

It's nothing compared to other things we try to do with energy.

One more thing to add, this is a plan to brighten the reflectance of ocean clouds by atomizing seawater. It will brighten the albedo of the entire planet.

A great way to do this is to mimic the ancient Amazonian Indians who pyrolyzed and smoldered plant waste and biochar fixed large amounts of carbon while improving the soil, creating good agricultural soils, as it can happen in many small ways in a small place.

This is where we are.

Nobel Prize-winning climatologist Paul Crutzen calls our geological epoch the Anthropocene, the epoch of human domination. We are bound by that obligation.

My first words in the Whole Earth Catalog were, "We are godlike beings, and we might as well do it well."

The first words of the Whole Earth Discipline are, "We are like God, and we must do it well."

thank you.

(applause)

I have a studio in Berlin, let me start here. Just last weekend I was in this snow.

We do a lot of experiments in the studio.

A studio is like a laboratory.

I have meetings with scientists from time to time.

And I have an academy as part of the Berlin University of the Arts.

Every year we host a gathering of people called Life in Space.

Life in space really isn't necessarily about how we do things, but why we do things.

Can you take a look at the little cross in the middle over there with me?

So just keep looking. please do not worry.

A yellow circle is displayed, so perform an afterimage experiment.

When the circle disappears, another color appears - the complementary color.

I'm saying something And your eyes and brain tell you something.

Think of this whole idea of ​​sharing, of superimposing what I say and what you say to compose reality, the movie.

For the past two years, I have been working on a joint film with a grant from the Berlin Ministry of Science.

I don't necessarily think the movie is that interesting.

Obviously, this is not interesting at all in a narrative sense.

But nevertheless, what the possibilities are, and keep your eye on them - what the possibilities are, obviously, is sort of shifting the boundaries of who is the author and who is the recipient.

Who is the consumer, if you will, and who is responsible for what they see?

I think there is a social aspect to moving that boundary.

Who decides what is reality?

This is the Tate Modern in London.

This show was kind of about that.

It was about the size of half a yellow half disc.

I also put a mirror on the ceiling and added some fog and haze.

And my idea was to make the space tangible.

With such a large space, the obvious problem is that there is a disconnect between what your body accepts and the space in that sense.

So I had the hope that I could make the space concrete by inserting elements of nature and, if necessary, fog.

And what happens is people start to see themselves in this space.

So look at this. look at the girl

Of course, in museums you have to look through a bloody camera. right? That's how museums work today.

But look at her face during checkout, looking at herself in the mirror.

"Oh, it was my foot!"

She wasn't sure if she was looking at herself.

And in that holistic way of thinking, how do we structure the relationship between our bodies and space?

How should I reconfigure it?

How can we know that being in space makes a difference?

You see when I first said that the "why" is important, not the "how"?

"Why" really means "What are the consequences of taking a step?"

"What's important?"

"Does it matter if I am in this world or not?"

"And does it matter if the kinds of actions I take lead to a sense of responsibility?"

Is that what art is like?

I think so. If you ask me, it's clear that it's not just about decorating the world and making it look better or worse.

Obviously, it's also about taking responsibility, as I did here when I threw green dye into rivers in Los Angeles, Stockholm, Norway, Tokyo, and elsewhere.

Green dye isn't dangerous to the environment, but it obviously looks pretty scary.

And even on the other side of it, I think it's very beautiful because it somehow shows this kind of mess of downtown and different parts of the world.

"Green River" was not part of an exhibition, but rather an idea of ​​an activist, in fact it was intended to show people walking through this city that space has dimensions. Space has time.

And the water flows through the city with time.

Water has the power to make cities negotiable and tangible.

Negotiable means that doing or not doing something makes a difference.

It doesn't matter if you say, "I am part of this city."

And when I vote, change happens.

If I take a stand, things change. ”

In a way, I think this idea that the city is not a painting is something that art has always tackled.

The idea that art can actually assess the relationship between what it means to be in a painting and what it means to be in space. What is the difference?

The difference between thinking and doing.

So these are another experiments on that. I will not enter them.

Iceland, bottom right corner, my favorite place.

These kinds of experiments are filtered into architectural models.

These are ongoing experiments.

One was the experiment we did for BMW, trying to build a car.

made of ice.

There is a crystalline stackable principle in the middle of the top, which is going to be a concert hall in Iceland.

It's like a running track or walk track made of colored glass on the roof of a museum in Denmark, and it goes around in circles.

In other words, moving your foot changes the color of the horizon.

And two summers ago, the Serpentine Gallery in London's Hyde Park was a kind of temporary pavilion, and moving was the only way to see it.

in New York this summer. The amount of time it takes for the water to fall has a lot to do with how much water falls.

It's very simple and basic.

I have walked a lot in the mountains of Iceland.

And when you come to a new valley, you come to a new landscape, you see a certain scenery.

When standing still, the landscape doesn't necessarily tell you how big it is.

It doesn't really tell you what you're looking at.

The moment you start moving, the mountain starts moving.

Large mountains in the distance slow them down.

Small mountains in the foreground move further.

And then you stop again and wonder, "Was that the Valley of the Hour?"

Or is it a 3 hour hike or is it a full day that I'm looking at? ”

If there's a waterfall there, it's right there on the horizon. You look at a waterfall and think, "Oh, the water is really slowly falling."

And they say, 'Oh my God, it's so far away and it's a huge waterfall.'

If the waterfall is falling fast, it's a small nearby waterfall. This is because the falling velocity of water is almost constant everywhere.

And your body somehow knows that.

So it follows that waterfalls are a way of measuring space.

Of course, being an iconic city like New York and being interested in playing around with a sense of space, you could also say that New York wants it to look as big as possible.

It's interesting to add measurements to this. The falling water suddenly gives you that feeling of, "Oh, this is exactly how far Brooklyn is. This is the distance between Brooklyn and Manhattan, in this case, the Lower East River."

In other words, it wasn't necessarily just about bringing nature into the city.

It also gave the city a three-dimensional effect.

And why would you want to do that?

This is because I think that the difference is not whether you have the body in front of the painting, but whether you have the body that can feel part of the space.

And then, "Hahaha, there's a picture, and this is me. So what does that have to do with it?"

Do you have a sense of repercussions?

So if I have a sense of space, if I feel that space is concrete, if I feel that there is time, if there is a dimension called time, then I also feel that I can change that space.

And suddenly there is a change in terms of making the space accessible.

You could say that this is about community, collectivity.

It means being together.

How to create public space

What does the word "public" even mean today?

So I think that when you ask that question, something wonderful emerges about parliamentary thinking, about democracy, about public space, about being together, about being an individual.

How can we create ideas that are tolerant of both without dichotomy between individuality and collectivity?

Of course, the world's political agenda is so fixated that it pits both sides against each other and differentiates them into different, highly normative ideas.

What I would argue is that art and culture, and that's why art and culture are incredibly interesting in the times we live in, have proven that they can create a kind of space that is both individual and collectively sensitive.

Exactly this causal relationship, the result is important.

It has a lot to do with how you link your thoughts and actions.

So what is between thinking and doing?

And between thinking and doing, we can say that there is an experience.

And the experience is more than just non-casual entertainment.

With experience comes responsibility.

To gain experience is to participate in the world.

Participating in the world is really about sharing responsibility.

In that sense, I think art has incredible relevance, especially in the world we're transitioning to right now.

that's all i have. thank you very much.

(applause)

If you ask evolutionary biologists when humans became humans, some will say that at some point humans started to stand on their own feet, became bipedal, and became masters of their environment.

Others would say that our brains have started to get much larger, so we can have more complex cognitive processes.

And some might argue that it's because we developed a language that allowed us to evolve as a species.

Interestingly, all three of these phenomena are related.

I'm not sure how or in what order it happened, but they're all related to changes in the shape of small bones at the back of the neck that change the angle between the head and body.

This means that not only were humans able to stand upright, but their brains evolved backwards, with vocal organs growing from 7 centimeters in primates to 11 centimeters and up to 17 centimeters in humans.

This is called laryngeal descent.

And the larynx is where the voice comes out.

When human babies are born today, their larynx has not yet descended.

It happens around 3 months after birth.

So, figuratively speaking, each of us here is reliving the evolution of an entire species.

Speaking of babies, when you started developing in your mother's womb, when you were only three weeks old and about the size of a shrimp, your first sensation from the outside world was touch, coming from the vibrations of your mother's voice.

As you can see, human voices are very meaningful and important, both at the level of species and at the level of society. This is how we communicate and bond, and on a personal and interpersonal level too, with our voice, we share more than words and data, we basically share who we are.

And our voice is indistinguishable from how others see us.

It is the mask we wear in society.

But the relationship between us and our own voice is not clear.

We rarely use our voices for ourselves. Use it as a gift to give to others.

That's how we touch each other.

It's dialectical grooming.

But what do we think of our own voices?

Raise your hand if you don't like the sound when you hear yourself on the recorder.

(laughter) Yes, thank you. Indeed, most people report not liking the sound of their voice recordings.

So what does that mean?

Let's figure it out in the next 10 minutes.

I'm a researcher at the MIT Media Lab and part of the Opera of the Future group, focusing on the relationships people have with their voices and the voices of others.

From neurology to biology to cognitive science to linguistics, we explore what we can learn from hearing sounds.

Our group creates tools and experiences that help people better and appliedly understand their voices in order to reduce bias, become better listeners, build healthier relationships, and understand themselves better.

And this requires a holistic approach to voice.

Because as we discover more about voice, think of all the applications and impacts it could have.

Your voice is a very complex phenomenon.

It requires synchronization of over 100 muscles in the body.

And by listening to that voice, we can understand what is going on inside and possible failures.

For example, hearing very specific types of turbulence or non-linearities in speech can help predict the very early stages of Parkinson's disease with just a phone call.

Listening for shortness of breath in the voice can help detect heart disease.

We also know that changes in tempo within individual words are very good markers of depression.

Your voice has a lot to do with your hormone levels as well.

A third person listening to a woman's voice was able to place the speaker on her menstrual cycle very precisely.

Acoustic information only.

And now, with technology listening to us all the time, Alexa on Amazon Echo may be able to predict if you're pregnant before you know it.

So think -- (Laughter) Think about what that means ethically.

Your voice has a lot to do with how you build relationships.

Each person who speaks has a different voice.

A little excerpt and analysis of your voice will tell you whether you are talking to your mother, your brother, your friend, or your boss.

You can also use speech pose as a predictor.

In other words, how to position your voice when speaking to someone.

And your vocal posture when speaking to your spouse can help predict not only if you'll get divorced, but when.

Therefore, there is much to be learned from hearing voices.

And I believe this has to start with understanding that we have multiple voices.

So, modeled on what I call masks, we talk about the three voices most of us have.

So when you look at a mask, what you see there is a projection of your character.

Call it your outer voice.

This is also the most classical way of thinking about the voice and how we project ourselves into the world.

The mechanism of this projection is well understood.

The lungs contract the diaphragm, which causes the vocal cords to vibrate independently and produce sound.

And the way the mouth cavity opens and closes, the vocal tract changes the sound.

So everyone has the same mechanics.

But the voice is rather peculiar.

That's because very subtle differences in size, physiology, and hormone levels lead to very subtle differences in the outward voice.

And your brain is very good at sensing that nuance from the external voice of others.

Our lab is committed to teaching machines to understand these nuances.

We also use deep learning to create a real-time speaker identification system to raise awareness about how shared audio space is used (who speaks and who does not during a meeting) to improve group intelligence.

And one of the difficulties is that your voice isn't static either.

I've already mentioned that it changes with each person you talk to, but it also changes throughout your life.

At the beginning and end of the journey, male and female voices are very similar.

It is very difficult to distinguish between a very young girl's voice and a very young boy's voice.

But in the meantime, your voice becomes a marker of your fluid identity.

In general, the male voice undergoes major changes during puberty.

A woman's voice changes with each pregnancy and undergoes major changes during menopause.

So they are all voices that other people hear when you speak.

So why are we so unfamiliar with this?

Why can't we hear voices?

So let's think about it.

You can't actually see the mask when you're wearing it.

And when you try to observe it, what you see is the inside of the mask.

And it's your inner voice.

To understand why it's different, let's try to understand the mechanism of perception of this inner voice.

Because your body has a lot of ways to filter out voices from outside in a different way.

Therefore, in order to recognize this voice, it must first reach your ears.

Outward voices travel through the air, and inward voices travel through the bones.

This is called bone conduction.

Because of this, the inner voice is heard in a lower range than the outer voice, and is musically more harmonious.

Once there, we need to access the inner ear.

And there's another mechanism going on here.

This is a mechanical filter, a small compartment that protects the inner ear by appearing every time a sound is played.

Therefore, the audible sound is also reduced.

And then there's the third filter, and it's the biological filter.

The cochlea (the part of the inner ear that processes sound) is made up of living cells.

And those living cells give off different triggers depending on how often they hear the sound.

It's a habituation effect.

Because of this, your voice is actually the most audible sound in life, making it harder to hear than others.

Finally, we have a fourth filter.

It's a nerve filter.

Neurologists recently discovered that when you open your mouth to make a sound, your own auditory cortex shuts down.

So you hear your voice, but your brain doesn't actually hear the sound of your voice.

Evolutionarily, it might make sense. Because we know how we sound cognitively, we probably don't have to expend our energy analyzing the signal.

This is called inevitable discharge, and it occurs with each movement of the body.

A precise definition of consequential discharge is a copy of the motor command sent by the brain.

This copy itself does not create movement, but instead is sent to other areas of the brain to signal impending movement.

And when it comes to voice, this well-deserved discharge also has a different name.

It's your inner voice.

Now let's review.

We have masks, outer voices, inside masks, inner voices, and inner voices.

And I like to see this as the puppeteer who holds the threads of the whole system.

Your inner voice is the voice you hear when you are silently reading a text or rehearsing an important conversation.

Sometimes it can be difficult to turn it off. It's really hard to see a text written in your native language without reading this inner voice.

It's also the voice that won't stop singing the silly song in your head.

(Laughter) And for some people it's really impossible to control.

And that is the case with schizophrenics who have auditory hallucinations.

No one can tell the difference between the voice that comes from inside their head and the voice that comes from outside.

Therefore, our lab is also working on developing a small device to help these people distinguish between voices and know whether they are internal or external.

You can also think of your inner voice as the voice that speaks in your dreams.

This inner voice takes many forms.

And in dreams, you actually unlock the potential of this inner voice.

That's another study we're doing in the lab. You are trying to access this inner voice in your dreams.

So, even if we cannot always control our inner voice, we can always engage with it through dialogue, through inner dialogue.

And we can even see this inner voice as the missing link between thought and action.

So I hope that we can give you a better appreciation, a new awareness of all your voices and the role they play within and outside of you. Because your voice is a very important factor in determining what makes you human and how you interact with the world.

thank you.

(applause)

I am an artist and engineer.

And lately I've been thinking a lot about how technology affects the way we perceive reality.

And it is done in an invisible and subtle way.

Technology is designed to shape our sense of reality by masking our experience of the real world.

As a result, we become unconscious and completely unaware that it is happening.

For example, consider the glasses I usually wear.

They are part of the way I usually experience my surroundings.

I hardly notice them, even though they have always constituted reality for me.

The technology I'm talking about is designed to do the same thing. In other words, change what we see and think without being noticed.

Now, the only time I notice my glasses is when something happens that draws my attention to them, like when they get dirty or when my power changes.

So I asked myself. “What can you create as an artist to draw similar attention to the way the press, social media platforms, advertising, search engines and other digital media are shaping our reality?”

So I created a series of perceptual machines that help us change the way we see the world and ask questions.

For example, today many of us have this kind of allergic reaction to thoughts that are different from our own.

We may not even be aware that we have developed this type of mental allergy.

So I created a helmet that causes an artificial allergy to red.

It simulates this hypersensitivity by making red things look bigger when worn.

There are two modes, nocebo and placebo.

The nocebo mode creates this ultra-allergic sensory experience.

Every time you see red, red spreads.

This is similar to the amplifying effect of social media, where when we see something that pisses us off, we tend to stick with like-minded people and exchange messages and memes, making us even more angry.

In some cases, small arguments can be amplified and disproportionate.

Perhaps that is also why we live in the politics of anger.

Placebo mode treats this allergy artificially.

Every time we see red, it shrinks.

As with digital media, this is a mitigation measure.

If we come across people with a different opinion, we will unfollow them and remove them from our feed entirely.

Avoiding this allergy cures it.

But this method of intentionally ignoring opposing ideas leaves human communities overly fragmented and isolated.

Devices inside the helmet reshape reality and project it into our eyes through a series of lenses to create augmented reality.

I chose red because the color is intense, emotional, highly visible, and political.

How about looking at the map of the last US presidential election through a helmet?

(Laughter.) Mediation changes our perceptions, so it turns out it doesn't matter if you're a Democrat or a Republican.

Allergies are present on both sides.

Digital media often mediates what we see every day, but it's also very nuanced.

If we are not aware of this, we will continue to be exposed to various kinds of mental allergies.

Our perceptions are not only part of our identity, but also part of the value chain in digital media.

Our visual realms are packed with so much information that our perceptions have become real estate commodities.

Design is used to exploit our unconscious biases, algorithms prioritize content that reaffirms our opinions, so every inch of our field of vision is colonized to sell ads.

For example, when this little red dot appears in a notification, it grows and expands, making it seem huge in your mind.

So I started thinking about how to add a little mud or change the lenses of my glasses and came up with another project.

Now, keep in mind that this is conceptual. It is not a genuine product.

This is a web browser plugin that can help us notice things we usually ignore.

Similar to Helmet, the plugin reconstructs reality, but this time it's reflected directly in the digital media itself.

Scream hidden filtered voice.

What you should focus on now is going to be bigger and more vibrant, like the stories about gender bias emerging from the sea of ​​cats here.

(laughter) Plugins may dilute what is being amplified by the algorithm.

Likewise, this comment section is full of people yelling about the same opinion.

This plugin makes comments very small.

(Laughter) So the amount of pixels they have on the screen is proportional to the actual value they contribute to the conversation.

(Laughter) (Applause) The plugin also shows the real estate value of our visual realm and how commoditized our perceptions are.

Unlike ad blockers, it shows you how much you should be earning for every ad you see on a web page.

(Laughter) We live in a battlefield between reality and commercial distributed reality. As such, the next version of the plugin may be able to break with commercial reality and show things as they really are.

(Laughter) (Applause) Now, you can imagine how far this is going to go in practice.

Believe me, I know the risks are high if this becomes a real product.

And I created this with the good intentions of training our perceptions and eliminating prejudices.

However, the same approach can be used maliciously. For example, having citizens install such plugins to control what they say.

It's hard to make it fair and personal without just being a layer of mediation.