



INTERVIEW

# RAY KURZWEIL

*Author, inventor and data scientist Ray Kurzweil has seen the future, and every single one of us is there. Kurzweil, who heads a team of more than 60 people as Google's director of engineering, believes advances in technology and medicine are pushing us toward what he calls the Singularity, a period of profound cultural and evolutionary change in which computers will outthink the brain and allow people—you, me, the guy with the man-bun ahead of you at Starbucks—to live forever. He dates this development at 2045. Many think he is a prophet for our digital age. A few say he's completely nuts. ¶ Raymond Kurzweil was born February 12, 1948, and he still carries the plain, nasal inflection of his native Queens, New York. His Jewish parents escaped Hitler's Austria, but Kurzweil grew up secular, worshiping knowledge above all and computers in particular.*

His grandmother was one of the first women in Europe to earn a Ph.D. in chemistry. His uncle, who worked at Bell Labs, taught Ray computer science in the 1950s, and by the age of 15, Kurzweil was designing programs to help do homework. Two years later, he wrote code to analyze and create music in the style of various famous composers. The program won him the prestigious Westinghouse Science Talent Search, a prize that got the 17-year-old an invitation to the White House. That year, on the game show *I've Got a Secret*, Kurzweil pressed some buttons on a data processor the size of a small car. It coughed out original sheet music that could have been written by Brahms.

After earning a B.S. in computer science and literature at MIT, he began to sell his inventions, including the first optical character recognition system that could read text in any normal font. Kurzweil knew a "reading machine" could help the blind, but to make it work, he first had to invent a text-to-speech synthesizer, as well as a flatbed scanner that is still in wide use today. In the 1980s Kurzweil

created the first electronic music keyboard to replicate the sound of a grand piano and many other instruments. If you've ever been to a rock concert, you've likely seen the name Kurzweil on the back of a synthesizer.

These days, Kurzweil plays the role of tech oracle to the Silicon Valley elite. His bestselling titles *The Age of Intelligent Machines* and *The Singularity Is Near* offer eerily specific forecasts on artificial intelligence, biotechnology and human evolution. Much of his work sounds like science fiction, but Kurzweil rationally lays out his vision at symposia, college lectures and confabs such as SXSW and TED.

At 68, Kurzweil has his finger in many pots. He co-founded Singularity University, a research institute and think tank that focuses on how science can solve humanity's challenges around water scarcity, overpopulation and energy shortfalls. His Google team is developing tools for machine intelligence and natural language understanding, including a series of "chatbots" that can converse with you and have different personalities. In his spare

time, Kurzweil started a hedge fund and just finished his first novel. He is a husband, father and grandfather.

Contributing writer **David Hochman**, who last interviewed Rachel Maddow, spent extended time in San Francisco with Kurzweil. "Talking to Ray is a little like chatting with Einstein, Mr. Spock and the Google guys all at once," Hochman says. "His intelligence is off the charts. He knows everything about everything, and it's all filtered through the lens of whatever's at the forefront of the wired world." Kurzweil, who wore a Google smartwatch on one wrist and a Mickey Mouse watch on the other, spoke for hours with his gaze fixed on the middle distance, as if he were in a kind of trance, Hochman says. The biggest surprise? "We were together for two days, and Ray didn't check his e-mail or text messages once."

**PLAYBOY:** You describe a near future in which nanobots inhabit our bloodstreams, our brains upload to the cloud and people never die. It sounds terrifying.

PHOTOGRAPHY BY **ALEX FREUND**





INTERVIEW

**KURZWEIL:** When people talk about the future of technology, especially artificial intelligence, they very often have the common dystopian Hollywood-movie model of us versus the machines. My view is that we will use these tools as we've used all other tools—to broaden our reach. And in this case, we'll be extending the most important attribute we have, which is our intelligence.

The capability of information technology doubles each year. At the same time, the price of the same functionality comes down by half every year. These are all features of what I call the law of accelerating returns. It's why you can buy an iPhone or an Android phone that's twice as good as the one two years ago for half the price. My smartphone is several thousand times more powerful and millions of times less expensive than the \$11 million IBM 7094 computer I used when I was an undergraduate at MIT in 1963. But that's not the most interesting thing about my phone. If I want to multiply computational and communication power by 10,000—that is to say, if I need to access 10,000 computers—I can do that in the cloud, and that happens all the time. We're not even aware of it. Do a complex language translation, a complex search or many other types of transactions, and you're accessing thousands of computers while you sit quietly in a park somewhere. Over the next couple of decades we're going to make ourselves smarter by integrating with these tools.

**PLAYBOY:** Humans are evolving into iPhones?

**KURZWEIL:** We're merging with these non-biological technologies. We're already on that path. I mean, this little Android phone I'm carrying on my belt is not yet inside my physical body, but that's an arbitrary distinction. It is part of who I am—not necessarily the phone itself but the connection to the cloud and all the resources I can access there.

**PLAYBOY:** Isn't what nature gave us enough?

**KURZWEIL:** We have limited capacity in our brain. It's at least a million times slower than computational electronics. The part of our brain where we do our thinking is called the neocortex. It's a very thin structure around the brain that emerged 200 million years ago with mammals, which were rodent creatures. The big innovation came 2 million years ago when

humanoids evolved and developed a large forehead. If you look at other primates, they have a slanted brow. They don't have a frontal cortex. That additional amount of neocortex is what we used to add higher levels of abstraction, and that was the enabling factor for us to invent, first of all, language, but also things like humor and music. No other animal can keep a beat. No other animal can tell a joke.

**PLAYBOY:** So plugging our brains into machines will make us exponentially smarter and more charming?

**KURZWEIL:** Exactly. By the 2030s we will have nanobots that can go into a brain non-invasively through the capillaries, connect to our neocortex and basically connect it to a synthetic neocortex that works the same way

# WE'RE STARTING TO REPROGRAM THE OUTDATED SOFTWARE OF LIFE.

in the cloud. So we'll have an additional neocortex, just like we developed an additional neocortex 2 million years ago, and we'll use it just as we used the frontal cortex: to add additional levels of abstraction. We'll create more profound forms of communication than we're familiar with today, more profound music and funnier jokes. We'll be funnier. We'll be sexier. We'll be more adept at expressing loving sentiments.

**PLAYBOY:** What exactly will that look like from the user end?

**KURZWEIL:** Let's say I'm walking along and I see my new boss at Google, Larry Page, approaching. I have three seconds to come up with something clever to say, and the 300 million modules in my neocortex won't cut it. I need a billion modules for two seconds. I'll be able to access that in the cloud just as we can access additional computation in the cloud for

our mobile phones, and I'll be able to say exactly the right thing.

But the truth is, we don't know what it will look like. Once we can expand our thinking in the cloud, our intelligence grows beyond anything we can currently comprehend. Our intuition about the future is linear. It's hardwired in our brains that way. Ten thousand years ago you would track an animal in the field and expect it to speed up as it went along. You would make a linear prediction as to where it would go so you could catch it. That type of thinking made sense, but it ignores the sort of exponential growth we see with technology. We're approaching a point where technological progress will become so fast that everyday human intelligence will be unable to follow it. It's a horizon past which the concepts we're familiar with are so transformed that it's hard to see past it.

**PLAYBOY:** This is the event horizon you call the Singularity. Why have you set its arrival so specifically in 2045?

**KURZWEIL:** The nonbiological intelligence created in that year will reach a level that's a billion times more powerful than all human intelligence today. But there will be dramatic changes prior to that. I've been consistent about these dates for decades now. One is 2029, which is when computers will pass a valid Turing test, meaning they'll be indistinguishable from human intelligence in a conversation.

**PLAYBOY:** How will all this help us live longer?

**KURZWEIL:** Let's start with genetics, which is now called biotechnology. It's beginning to revolutionize clinical practice and will completely transform medicine within one to two decades. We're starting to reprogram the outdated software of life—the 24,000 little programs we have in our bodies, called genes. We're programming them away from disease and away from aging.

For instance, at the Johnson & Johnson Diabetes Institute, they turned off the fat insulin receptor gene that tells you to hold on to every calorie in your fat cells. That was a good idea 10,000 years ago when our genes evolved, because the next hunting season might not work out so well. But today it underlies an epidemic of obesity, diabetes and heart disease. We'd like to turn that gene off. They tried it in

GROOMING BY ERIC FERRELL FOR DION PERONNEAU AGENCY; HAIR BY QUAN PIERCE FOR DION PERONNEAU AGENCY



---

## INTERVIEW

animal experiments. The animals ate ravenously but remained slim. They didn't get diabetes. They didn't get heart disease. They also lived 20 percent longer. And that's just one example of 24,000 genes.

We're involved with a company where we add a gene to people who are missing a gene that causes a terminal disease called pulmonary hypertension, and the treatment has actually worked in human trials. We can subtract genes. We can modify stem cells to have desirable effects such as rejuvenating the heart if it's been damaged in a heart attack, which is true of half of all heart attack survivors.

The point is healthcare is now an information technology subject to the same laws of acceleration and progress we see with other technologies. We'll soon have the ability to rejuvenate all the body's tissues and organs and develop drugs targeted specifically at the underlying metabolic process of a disease rather than taking a hit-or-miss approach. But nanotechnology is where we really move beyond biology.

**PLAYBOY:** Tiny robots fighting disease in our veins?

**KURZWEIL:** Yes. By the 2020s we'll start using nanobots to complete the job of the immune system. Our immune system is great, but it evolved thousands of years ago when conditions were different. It was not in the interest of the human species for individuals to live very long, so people typically died in their 20s. The life expectancy was 19. Your immune system, for example, does a poor job on cancer. It thinks cancer is you. It doesn't treat cancer as an enemy. It also doesn't work well on retroviruses. It doesn't work well on things that tend to affect us later in life, because it didn't select for longevity.

We can finish the job nature started with a nonbiological T cell. T cells are, in fact, nanobots—natural ones. They're the size of a blood cell and are quite intelligent. I actually watched one of my T cells attack a bacteria on a microscope slide. We could have one programmed to deal with all pathogens and could download new software from the internet if a new type of enemy such as a new biological virus emerged.

As they gain traction in the 2030s, nanobots

in the bloodstream will destroy pathogens, remove debris, rid our bodies of clots, clogs and tumors, correct DNA errors and actually reverse the aging process. One researcher has already cured type 1 diabetes in rats with a blood-cell-size device.

**PLAYBOY:** So if we can hang on for 15 more years, we can basically live forever?

**KURZWEIL:** I believe we will reach a point around 2029 when medical technologies will add one additional year every year to your life expectancy. By that I don't mean life expect-



tancy based on your birthdate but rather your remaining life expectancy.

**PLAYBOY:** That's a lot of *Friends* reruns. Won't we get bored?

**KURZWEIL:** Ennui is certainly one of the challenges. If we're doing the same things for hundreds of years, life will become profoundly monotonous. But that's true only if we have radical life extension without radical life expansion. So we're going to make ourselves smarter, as we're doing already, but as we directly merge with this technology and expand our thinking into the cloud, we're going to be adding more levels of abstraction to our thinking.

Just as we went from primates to humans and invented art, music and science, with that additional neocortex we're going to be adding even more profound forms of communication and more profound activities as we, again, add to the levels and scope of our neocortex. We're going to have fantastic virtual environments. We can enjoy any earthly environment, but we'll also have fantastic imaginary environments limited only by our imaginations, and our imaginations are going to become greater.

By the 2030s, you and I could be hundreds of miles apart, and it will seem just as though we're sitting together as we are now—there are even technologies that will enable us to touch one another. I actually have some patents on that. Facebook's \$2 billion acquisition of Oculus Rift is just one harbinger of the coming era of virtual reality. Today the technology is not quite realistic, but by the mid-2020s, with retina-based devices transmitting images directly to your retina, similar devices in your ears and other sensors that stimulate the tactile sense, you and I could be in different locations and yet feel completely as though we're both at a table in the Taj Mahal or walking on a virtual Mediterranean beach, feeling the moist warm air on our faces.

By the 2030s this technology will go inside the nervous system. I mentioned nanobots that will connect your neocortex to the cloud. Another application will be to send signals directly to your neocortex as though they're coming from your senses. So your brain will feel like it's actually in the virtual environment. It's going to be extremely realistic and incorporate all the senses.

**PLAYBOY:** Sex often leads the way in technology. It sounds like the future will see plenty of innovation on that front.

**KURZWEIL:** Yes. Early adoption of new communication technologies often involves sexual applications. Gutenberg's first book was the Bible, but that was followed by a lot of more prurient titles. The same thing happened with film, videotape, the internet and products such as *Second Life*, which was an early attempt at virtual reality and has a large adult sexual-interest section. And as virtual reality becomes more realistic, certainly sexual activity will be extremely popular.



---

INTERVIEW

**PLAYBOY:** How do you envision the future of sex?

**KURZWEIL:** Not only will people be able to have sex together in different locations, but you will have the ability to change who you are and who your partner is. In virtual reality you don't have to inhabit the same body you have in actual reality. A couple could become each other, for example, and experience the relationship from the other's perspective. You could transmit a more idealized version of yourself to your lover, or she may alter how she wants you to look.

**PLAYBOY:** So looking normal won't be an option for sexual partners of the future? We'll all be super-idealized physical forms?

**KURZWEIL:** I think we'll expand our concept of what's normal. I mean, we're doing that already. People are doing things to their bodies that were considered radical some decades ago and are now considered mainstream, like tattoos and piercings but also cosmetic surgery. As you go into virtual environments, some people create avatars that look very much like themselves, and other people create fantastic new types of creatures. I think our aesthetic will modify, given the freedom of virtual reality, so you won't have to be the same person all the time, but you could when you want to be.

**PLAYBOY:** What you're describing could change the very nature of relationships, not to mention redefine what it means to be monogamous.

**KURZWEIL:** We have already to some extent separated the biological function of sex from its communication, sensual and recreational purposes. You can certainly have sex without having babies, and you can even have babies without having sex. In virtual reality we will have even more freedom to experiment.

We already have more lines to draw today than we did in the past. Is watching pornography infidelity? Well, couples disagree about that. People have different opinions. Communicating in a sexual manner over the internet, is that infidelity? Some people think yes; some people think no. If you get tired of your partner, you can turn your partner into someone else, or you can transform yourself. You'll have that option as well.

**PLAYBOY:** You and your wife have been married for more than 40 years. But is there anyone whose body you would like to inhabit?

**KURZWEIL:** That's a good question. I haven't been asked that one before. Probably some attractive woman. If I had to pick one? Amy Adams. I like the perky way she uses her body.

**PLAYBOY:** Fascinating. Do you have any other pop culture crushes?

**KURZWEIL:** [Pauses] Taylor Swift.

**PLAYBOY:** You listen to Taylor Swift?

**KURZWEIL:** I do. I think she's very soulful, and her voice has gotten better too. "Teardrops on My Guitar" is a pretty great song. I was hoping to meet her at the Grammys this year, but she was sitting too far away from me.

**PLAYBOY:** In the 1980s, you invented the Kurzweil K250 music synthesizer, the first keyboard capable of simulating the sound of a grand piano and other orchestral instruments. Stevie Wonder, Eric Clapton and Prince are

## THE MOST PROFOUND LIMITATION WE HAVE IS THAT OF OUR LIFE SPAN.

among its many fans. Do you have any rock star moments to confess?

**KURZWEIL:** Nothing too scandalous. My friendship with Stevie Wonder goes back to 1976, when he invited himself to my office to listen to the Kurzweil reading machine for the blind. My wife and I hung out with Ray Charles. More recently, Alanis Morissette approached me at an airport to thank me for the Kurzweil keyboard. It's rewarding, but I've always been shy. Unstructured social situations make me nervous.

**PLAYBOY:** Every generation has its defining psychological label, and armchair therapists today love throwing around the catchall terms *on the spectrum* and *Asperger's*. Some have used those terms to describe you.

**KURZWEIL:** I do see some social awkwardness in myself and in some of my associates

who are brilliant in technology. But we're intelligent enough to compensate for that and find ways of interacting with people. I have always dreaded cocktail parties, but I've always had one good male friend and, from an early age, was able to connect one-on-one with women. I met my wife at a party and spilled red wine on her pants, which might have been intentional. I insisted that I wash it out with her leg still in it. We fell in love very quickly and got engaged within a year.

**PLAYBOY:** Let's move on. Your employer, Google, is a behemoth now. How does it avoid becoming the next IBM?

**KURZWEIL:** I think the Google leadership realizes, as do most enlightened technology leaders, that paradigms are short-lived and you have to constantly reinvent yourself. You can't ride just one paradigm and one algorithm, though the PageRank algorithm that underlies search has certainly been one of the most successful algorithms in history.

At Google we're constantly looking for new ideas and for people who can fashion new ideas and success. I run a team of more than 40 really brilliant scientists. We're working on natural-language understanding, trying to get computers to understand the meaning of documents, and it's quite an incredible team. That's actually the most important resource I have discovered at Google: the talent there.

**PLAYBOY:** Do you think universities will still matter a hundred years from now?

**KURZWEIL:** Those institutions represent a confluence of intelligent people. Good ideas come from smart minds working together. But education is changing. One of the beneficial things we'll have from technology is very high-quality learning, from preschool to graduate school, all free and all online—including interaction with teachers and fellow students. I think the principal role of education should be to encourage people at all ages to do projects and learn from those projects. The most important reality of what we call Silicon Valley is the freedom to fail. Here we call it failure of experience. You have to be an optimist to be an entrepreneur.

**PLAYBOY:** You certainly are optimistic. But in many ways, the world is an increasingly difficult and dangerous place. Look at the continued violence in the Middle East and the totalitarian



## INTERVIEW

regimes in Africa and North Korea, not to mention corruption, racism and greed.

**KURZWEIL:** Well, I wouldn't put all those phenomena in the same basket. Despite oppressive regimes, the consensus is actually moving in the right direction toward greater liberty, freedom and democracy. That wasn't always the philosophy of the world. I mean, there were almost no democracies 200 years ago and only a handful 100 years ago. Not every society is a perfect democracy today, but most believe it is the desirable norm we should seek.

This is the most prosperous and peaceful time in human history. If you read Steven Pinker's book *The Better Angels of Our Nature*, he documents a very profound inverse exponential in violence. Your chance of being killed hundreds of years ago was far greater than it is today because there was extreme scarcity of resources hundreds of years ago. Technology is driving progress here too. On one hand we're seeing more violence because people are capturing it on their cell phones. But that brings awareness to it. In the past, the next village could have been destroyed and you might never have heard about it.

Human life has become immeasurably better. The poor today have amenities that kings and queens didn't have one or two centuries ago, including refrigerators and toilets, not to mention computers, televisions and recorded music.

**PLAYBOY:** A vast digital divide separates those with access to communications technology from those without access. Won't that gap only get wider?

**KURZWEIL:** No. People think the world is getting poorer, but according to the World Bank, for example, poverty in Asia has been cut by 90 percent over the past 20 years because these societies have gone from primitive agrarian economies to thriving information economies. The internet is entering developing areas at a rapid rate. The kid in Africa with a smartphone has more intelligent access to information than the president of the United States did 15 years ago, and progress like that spreads very quickly. It's a radically different world than it was a generation or two ago.

**PLAYBOY:** We live in interesting times.

**KURZWEIL:** Very interesting. People say they don't want to live forever. Often their objection is that they don't want to live hundreds of years the way the quintessential 99-year-old is perceived to be living—frail or ill and on life support. First of all, that's not what we're talking about. We're talking about remaining healthy and young, actually reversing aging and being an ideal form of yourself for a long time. They also don't see how many incredible things they would witness over time—the changes, the innovations. Me, I'd like to stick around.



**PLAYBOY:** Last year Bill Gates said, "It seems pretty egocentric, while we still have malaria and TB, for rich people to fund things so they can live longer."

**KURZWEIL:** Bill Gates is completely ignoring the 50 percent deflation rate that's inherent in information technology. You did have to be wealthy to have a mobile phone 20 years ago. They didn't work very well. They did one thing, which was make phone calls, and they did it poorly, and they didn't fit in your pocket. Today there are billions of them doing a million things, and they're basically free. By the time technologies work well, they're affordable for

almost everyone. By the year 2020, you won't require as much wealth in general.

**PLAYBOY:** We won't need money in the future?

**KURZWEIL:** We'll be able to survive with very little money. Not that I advocate that. Money will be important. But as we get to the 2020s, we'll be able to print out most of the material resources we need with 3D printers and similar technologies. We'll be able to print clothing at pennies per pound, which is what 3D printing costs, and there will be an open-source market with free designs you can download and then print out on your printer.

**PLAYBOY:** What about our energy and food needs?

**KURZWEIL:** Certainly within 20 years we'll be meeting all our energy requirements through solar and other renewables. We're awash in energy—10,000 times more than we need, from the sun—and we're going to move to these renewables not just because we're concerned about the impact on the environment but because it will be cheaper and more economic.

We know how to clean up or desalinate water using other emerging technologies, such as Dean Kamen's Slingshot water-vapor-distillation system, at very low cost, particularly if we have low-cost energy. We're going to have a vertical agriculture revolution where we'll grow food in vertical buildings, recycling all the ingredients and resources so there's no ecological impact, unlike the environmental disaster represented by factory farming. Pesticide-free fruits and vegetables done through hydroponic plants, in vitro cloned meats.

**PLAYBOY:** Many of your past predictions were accurate, but you got plenty wrong too. In *The Singularity Is Near* you wrote that by 2015 we would be able to depend on robots to clean our houses.

**KURZWEIL:** I don't think I actually said that, but if you google my predications, you'll see I've fared quite well overall. I did an analysis of the predications I made for 2009 in the book *The Age of Spiritual Machines*, which I wrote in the late 1990s. I made 147 predications, and 86 percent were correct. Even some of the ones that were incorrect, like self-driving cars, were not all that incorrect. They were off by just a few years. Directionally it was pretty accurate.



---

INTERVIEW

**PLAYBOY:** Do you know what your IQ is?

**KURZWEIL:** It was measured when I was a child at 165, and I haven't measured it since.

**PLAYBOY:** Does it bother you that some people think you're crazy? Pulitzer Prize-winning science writer Douglas Hofstadter compared your work to "dog excrement."

**KURZWEIL:** I think that particular statement reflects poorly on him. The difference between myself and my critics is that we're looking at the same reality, but they apply their linear intuition about where we will go, and I'm thinking about it from the exponential perspective. The good news is, the evidence for my position is everywhere around us. I gave a speech not too long ago to junior high school science winners from around the country, and they came up afterward and said, "Oh, that's really so true. Things were so different when I was eight." [laughs] People are seeing the results of exponential growth because you don't have to wait that long now to actually see it unfold.

**PLAYBOY:** Other critics call you a utopian dreamer. Not to put a damper on things, but what is to stop darker forces from using the technologies you describe and putting society in grave peril?

**KURZWEIL:** First of all, my view of the future is not utopian. There will always be problems. Privacy is a big issue, for instance. But in some ways, privacy is getting better too. I grew up in an era when you couldn't have a private phone conversation: You didn't know who was listening in on the line, because there were other extensions. Today, communication is private, and even the occasional intrusions are fairly benign. I run into very few people, if any, who tell me their lives were ruined by some invasion of privacy. That's not to say it's not a serious concern, as some large companies have discovered. But so far, encryption is advancing more rapidly than the technologies of decryption.

**PLAYBOY:** What about bioterrorism?

**KURZWEIL:** It's a concern. If a bioterrorist releases a new biological virus, that's a serious danger. But we can combat it. I was in the Army Science Advisory Group, and my issue was protecting ourselves against bioterrorism. Today we have a rapid-response system. We can sequence a virus almost instantly.

That's another example of exponential growth: HIV took five years to sequence; SARS took 31 days. We can now do it in one

day. So we can then very quickly create either an RNA-interference-based medication or an antigen-based vaccine and spread protection quickly if there were an outbreak. This is part of the protocol that emerged 30 years ago from the Asilomar Conference, which established guidelines and ethical standards for responsible practitioners, as well as a rapid-response system just in case.

**PLAYBOY:** Could hackers shut down the internet with computer viruses?

**KURZWEIL:** Early on, it was predicted that software viruses, which were just then emerging, would ultimately become so powerful they would render the internet useless, and part of that prediction came true. Software viruses did become very sophisticated and powerful, but

## PARADIGMS ARE SHORT- LIVED. YOU HAVE TO CONSTANTLY REINVENT.

we also have a technological immune system that detects new viruses and semiautomatically reverse-engineers them and puts out antidotes that are spread virally on the internet in the form of antiviral software. This is the paradigm we use to keep these technologies safe, but it's not a pat solution, because the technology keeps getting more sophisticated. Yes, the dangers get more dangerous, but our tools for combatting them also become more powerful.

**PLAYBOY:** Then there's simple distraction. More than 25 percent of auto collisions involve cell phones, and people are going to rehab for internet addiction. Do we really need more technology?

**KURZWEIL:** It depends on the kind of technology you're talking about. The automobile is okay technology, but it's not great. Humans are indeed very bad drivers. In the course of this interview, dozens of people have died

around the world from human drivers. There are 1.2 million deaths and millions of injuries each year caused by human drivers, which is why self-driving cars are on the way. It's just another example of how technology will make life safer and healthier.

**PLAYBOY:** But what about this trigger-finger impulse we all have to check our screens at every stoplight, at every pause in a conversation? That can't be healthy.

**KURZWEIL:** Humans have a proclivity to addiction, and that certainly extends to technology. Books by Sherry Turkle and others articulate that we would rather communicate on our devices than with each other. But generally speaking, there's another person at the other end of that device. Teenagers and even younger children growing up today are communicating with people around the world in ways that are very uplifting and educational.

Time triage is actually the most important decision we have. What are we going to spend our time on? As we learn more about the brain and expand our brains through merging them with technology, we're going to treat it as a network to improve our use of time in more creative and profound ways.

**PLAYBOY:** Do you ever turn your brain off, so to speak?

**KURZWEIL:** I like bicycling. I like to walk and hike and just let my mind be free and not try to guide it. I also do that while falling asleep, so I like to take naps. This novel I just wrote with

my daughter is called *Danielle*, and it's about a precocious young girl. I would have fantasies about her as I drifted off to sleep. That was actually the source of the ideas in that book.

**PLAYBOY:** You literally write books in your sleep?

**KURZWEIL:** It's a mental technique in which I assign myself some challenge or question before dozing off. For me it could be a decision. Should I hire this person? Should I do this business deal? Or it could be a literary issue, like how am I going to express this idea in something I'm writing? It could be an interpersonal issue. It could be a math problem. I try not to solve it, but rather I let my mind free, and if I wake up in the middle of the night, as I invariably do once or twice, I often find myself dreaming in a strange, oblique way about this question.

Freud understood this. He said the censors



## INTERVIEW

in your mind are relaxed in your dreams, which is why you'll dream about things that are culturally and sexually taboo. Well, there are also professional taboos. We have very set ways of thinking about certain types of issues, particularly in science. When those rules are relaxed, I find some strange and wonderful ways of solving problems.

**PLAYBOY:** Have you used drugs to expand your thinking?

**KURZWEIL:** I smoked pot in college for a period, and it was a way of changing your consciousness. I've always been wary of LSD, because if you end up on a bad trip, you can't get off the ride. Alcohol is probably the oldest means we've had of changing our consciousness, escaping the anxiety of reality, and it can be useful for that. I enjoy gently relieving anxieties through a glass of wine. But I think our greatest opportunities to be creative, to communicate with others and to have relationships are fostered by technology. That's the best opportunity to transcend.

**PLAYBOY:** Would you say technology is your religion?

**KURZWEIL:** Religion originated in prescientific times, and it attempted to answer valid questions, such as why are we here and what is this incredible miracle of people coming into existence who didn't exist before? And then the inverse miracle of them disappearing, and where did they go, and what happens, and what is the nature of consciousness, and do we really have free will, and what are we supposed to be doing when we're here? Religion came up with valid insights.

I'd say the most important is the Golden Rule, in which our moral systems attempt to emulate one way or another to treat other people the way you would wish to be treated. Today we have more insight into the nature of reality from physics, biology and neuroscience, so we should update our answers to these questions based on our greater understanding of the world.

**PLAYBOY:** There are many things science isn't able to explain.

**KURZWEIL:** That's true. In particular, science does not provide a definitive answer to the issue of consciousness. There's actually no falsifiable experiment you could run that would

definitively answer the question of whether or not an entity is conscious. You could ask the entity, and some character in a video game today could say, "Yes, I'm conscious, and I'm very angry at you," and we wouldn't believe it, because it doesn't have the subtle cues we associate with having those subjective states. But my contention is, as we get to the 2030s, artificial consciousness will be very realistic. That's what it means to pass the Turing test. And we will believe it, and they'll get angry at us if we don't believe them, and since they'll be



very smart, we don't want that to happen. But is that consciousness? John Searle, a philosopher of technology at Berkeley, says consciousness is just another biological attribute, like digestion, lactation or respiration, but that's not the case. We can't really tap into the subjective experience of another entity. Are animals conscious? We don't know. That question is the root of the animal rights issue. I think my cat, before he died, was conscious. Not everybody agrees with that, but they probably hadn't met my cat.

**PLAYBOY:** Is it true you've elected to be frozen in the event of your untimely demise?

**KURZWEIL:** Yes, with the view toward being reanimated some decades from now. I think that will be feasible in the 2040s.

**PLAYBOY:** How do you feel about that prospect?

**KURZWEIL:** Poorly. I have enough trouble staying on top of my responsibilities when I'm alive and kicking, so the idea of being in suspended animation for decades is not appealing. That's plan D. Plan A is to make it through, and I'm doing well. So far so good. I wrote these books actually as a way of encouraging myself and shaming myself into taking good care of my health so I would be an exemplar of what I'm talking about. Plan B is also to make it through. Plan C is the same thing.

**PLAYBOY:** If you die before the Singularity arrives, does that mean you've failed?

**KURZWEIL:** Yes. I regard death as the greatest tragedy. People talk about getting used to death and accepting it, but the end of each life is a terrible loss, like the Library of Alexandria burning down. All that information, all their skills, their personality, their memories are gone. The people who loved that person also suffer. A significant portion of their neocortex had evolved to understand the person and interact with them, and then suddenly that person is no longer there for them to use that part of their brain, which leads to the shock of mourning. I call mourning the price of love.

But I think it's humanity's mission to transcend our limitations, and the most profound limitation we have is that of our life span. That's the hardest thing for people to accept, because birth and life and death have been with us since the

beginning of recorded history. But I can see a path that's not far off where we can indefinitely extend our lives.

**PLAYBOY:** Will we know when we've reached this period you're talking about?

**KURZWEIL:** That's a good question. I mean, nothing is ever certain. I could be hit by the proverbial bus tomorrow. I do believe we will begin to overcome the causes of our short lives, and that's going to become a flood in the very near future. But you're right: We can never truly know eternity. As hard as I try, I can never come back to you and say, "Hey, I've done it. I've lived forever," because it's never forever. ■