



**The Future of Technology:
The next 30 years**

**Presenter:
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The world of the future may look very different from today. From renewable energy sources, robotics and space travel, new emerging technologies are far closer and more possible than we think.

Futurist, Shara Evans takes a peak into the future and takes us through what she sees emerging in the next 20 – 30 years,

Hello everyone. My name is Shara Evans and I'm a technology futurist. It is my absolute delight to be here today with CommBank's Women in Focus team. We're going to have some fun today because I'm going to be talking to you about the future and not the near term. I'm going to be going out 20 to 30 years. And boy, things are going to be a little bit different than they are today.

Now, whenever I do a longer term futurist prediction, I like to anchor things on scientific fact and experiments that are happening today, but then extrapolate out. But I also need to make some assumptions to paint a scenario for what this future world might look like. So, my assumption, that I'm going to make today, is that yes, we're going through a bit of a corona coaster ride right now, but we come out of it okay. We may be a little bit battle scarred, but in the end, it's all going to be fine and humanity's going to be fine. And we're going to have a bright future in front of us, but there are going to be a lot of things that are different. So, let's have some fun and take a look at what the world of the future could look like.

One of the areas that is going to be super important as we move into the future, starting now, and even going further and further out, is renewable energy sources. Today, our primary sources of renewable energy are solar power, which is wonderful, but of course, to use solar power, we need to have the sun shining. So, that means that we don't get solar power at night. If it's raining, we're not going to get solar power, or if there's any other thing in the atmosphere like dust or smoke from a bushfire or something else, we've got a problem.

Another renewable source of energy today, is wind power. And in various places we see big wind farms. A few years ago, I was in California, driving from Los Angeles all the way out to Palm Springs. And there were tons of wind farms that I passed, but most of them were inactive. So, they weren't whirling around or generating any energy.

Another renewable that we're already starting to see, and this is fairly new, is something called green hydrogen. So, with green hydrogen, what we're doing is we're taking hydrogen from renewable energy sources, like solar or wind. And the way that we generate hydrogen is through electrolysis. And literally, we're taking water and we're splitting it into hydrogen and oxygen. And then we're using it to either fuel up batteries or generate electricity, or maybe even use in vehicles.

Another technology that's on the scientific horizon, but is still very experimental, is nuclear fusion. So, if you think about nuclear power, you're probably thinking about nuclear fission, which is the type of nuclear plants that you're seeing today. With nuclear fusion, there's a lot less waste energy, but it also requires the kind of power that we see in the sun. So, think of it as a star in a jar. And we're generating plasma that can be anywhere from 80 million degrees Celsius up to about 200 million degrees Celsius. And there's different ways of potentially containing that energy. But it's still very experimental and likely to be at least 20 years before we start to see it.

But if we do, it could become a really interesting source of energy, especially for space travel. Because, if we had a spaceship that was propelled by nuclear fusion, we could get from here to Mars in 39 days. Think about that one.

But there are some new kids on the block when it comes to renewable, clean energy sources that you may not have heard of. One of them is called blue energy. And it's basically taking energy from salt water as it meets a large body of fresh water. So, think about Australia, think about how many rivers flow into the ocean, just around our continent. Every time that you get fresh water meeting salt water, it generates energy. And the way that you capture it is by putting in these porous membranes. And there are various methods of doing it. And I won't go into all the chemistry, but this is one of the new kids on the block. And guess what? The only waste product is brackish water, that's salty water, and that's not going to harm our planet at all.

Another new energy source that's being played around with right now, in particular in Finland, is wave energy. And in fact, this is not something that's just been thought of right now. In the UK alone, since 1855, there are over 300 patents that were filed, but it sort of was back burner for a while. One of them, that I think, has a potential of becoming a real energy source is this picture up here on the left, which is a Wave Roller. And this is a real one from a Finnish company that they've deployed in Portugal. And it looks like a ship rudder. And what it's doing is its taking energy from waves, as they roll along in shore. And depending on the distance of the wave and the speed of the wave, it's able to generate energy. And then through a subsea cable, it feeds into, let's say, a hydroelectric energy plant or a desalination plant or something else. Again, this is a completely renewable source and we have an abundance of waves on this planet.

As we go into the future, what's going to happen to us humans? Are we going to take technologies into our human bodies? Will we become cyborgs? Well, I don't know, maybe we will. From a medical standpoint, we've been putting technology into our body for decades now, in the form of pacemakers and insulin pumps and other medically required instruments. But as we go into the future, there's a groundswell in the scientific community of putting implants into our brains, and maybe even merging our brains with machines.

A lot of the early work in this has been with scientists that are looking to help people who have memory issues. So maybe elderly citizens with dementia or Alzheimer's, and coming up with methodologies where they can actually put a chip inside their brain to allow them to store memories and then access those memories that were lost. In more recent years, the focus has shifted, with Elon Musk being a big proponent of this with his Neuralink Company, of saying, "But why don't we put an AI chip into our brain and help us stave off the march of robots, by actually making us partners with an AI chip inside of our head?" So, he moved a little bit away from that initial concept, as they started to develop these Neuralink chips, with the initial focus being on medical, to help people who had been paralysed and had completely separate spines, and put these teeny tiny nanochips into their heads to help them walk again.

More recently, he's been talking about things like being able to control emotions, like with depression, or perhaps post-traumatic stress, again, by balancing hormone levels, or even perhaps streaming music directly into your head. There are lots of companies and experiments around the world that are looking at, will we put implants into our brains and maybe merge ourselves with machines? But think about this, who owns that chip that's in your head? What happens if somebody hacks into that chip? What are you going to do? Wipe your brain, like you would wipe a computer and do a restart? Oh gosh, I hope not. That would be pretty bad.

There are a lot of ethical issues with this, including what happens if you have a fleeting thought and the chip thinks that it's a real thought? Like, let's say you're driving and you're going down the road and somebody cuts you off and you have a thought, "Somebody ought to rear end that such-and-such," but you're not actually going to do it. It's just a fleeting thought. But the chip inside your head thinks you really want to do it. Oh my gosh.

Then there are nanobots. And there are a lot of experiments already happening around the world today with nanobots. One that are really like, I found out about in 2019, when they published a scientific paper, it's a collaboration between a nanoscience technology institute in China and Arizona State University. Where they designed an experimental nanobot that is able to literally starve off cancer tumours by rolling up DNA strands and coding them with a protein that recognised a particular type of cancer and literally starving off the blood supply.

Can you imagine if we had nanobots that were able to target specific things in your body and fix them at the nano scale level? Imagine what nanobots will be able to do in the future, in the next 20 or 30 years, if this is the sort of thing that is happening in research labs right now. What if we had nanobots in our bodies that are able to detect the first sign of illness and literally fix it? What if we broke a bone and it started to repair the bone for us, or even fixed a DNA strand that might be broken? I'll tell you what, if we have these nanobots in our bodies today, my guess is that coronavirus wouldn't even be a thing. Because it would be detected as soon as it got into our body and eliminated by these little tiny nanoscopic, microscopic robots. And that's what these are, they're robots.

And when it comes to the future of health, there are some other things on the horizon that are truly, truly exciting. And that has to do with genetic sequencing, understanding the genetics in our own body. Genetic engineering and regenerative medicine and precision medicine. So, there are already researchers today at the Salk Institute that have done experiments on mice. One in particular, a mouse had this rapid aging disease called progeria, where they were able to turn back the clock and make the mouse younger than it was before they started the experiment.

Can you imagine deciding, "Well, I'd like to set my biological body age at 20 and just keep it at my 20 year old body." Well, what if we found the gene that actually controls aging and there are scientists that think that is imminent in the next 10, 15 years or so. And when we do, we will be able to live to 400 or maybe even 800 years old. Can you imagine working for 400 years? Can you imagine being married to one person for 800 years? You might love your partner very dearly, but in 800 years, your interests are very likely to go in different directions.

The shape of human society could be radically changed by these technologies. And not only that, but what if we use these same genetic engineering technologies to alter our bodies to be able to live in different environments? And here, I'm talking about outer space. So, you might think, "Well, that's science fiction for sure. It's not going to happen in 20, 30 years. It's not going to really happen in my lifetime." Well, guess what? Surprise, it's happening right now, I'm speaking to you. Private industry has already developed reusable space rockets. That is the game changer. That is what is going to let us start to explore all of the world around us. And I don't mean planet Earth, I mean the entire solar system and perhaps even beyond.

So just let me make a quick analogy. If you can imagine an airplane that you could use only one time, the cost of a ticket would be super expensive, just like it's super expensive to send something up into space right now. But with reusable rockets that have already been tested by a number of private companies, in the here and now, imagine that becoming a big industry over the next 10, 20, 30 years. We already have missions that are being planned by both space agencies, from different countries around the world, and private industry to put us back on the moon and to even take us into Mars.

There is a good possibility if Elon Musk has his way, that there will be a colony on Mars that is self-sustaining by the year 2050, and that he'll have at least a thousand or more of his starships going back and forth between the Earth and Mars. And he is not the only one doing this. I was recently listening to a radio show, where a space expert was being interviewed and he was describing how many space start-ups are starting to emerge. This is going to be a really big industry, and it's going to create so many jobs, not only for the people who go into space, but for the people who are still down here on Earth, designing these spaceships and putting together all the things that are necessary to start to design habitats on other planets.

Another thing that's super exciting is that we are discovering very, very recently, that there's actually water on the sunlit part of the moon. And this was only announced by NASA at the end of October of 2020. And they're not quite sure how it got there. It may be projectiles from the sun. It may be meteor structure. It may have just been buried underneath and has come out to the surface.

We've also discovered that there is water on Mars and some other more recent scientific explorations have shown that some of it may actually flow on the surface from time-to-time.

So our next human habitat may look something like this, your children or your grandchildren may be living in a habitat that looks something like this mock-up. And it is going to open up so much for humanity. We will become a multi-planetary civilisation. And someday, perhaps sooner, rather than later, even venture out beyond our own solar system.

Just a few days ago, I heard a newscast where scientists had already confirmed that they have found over 2,400 exoplanets, just in our galaxy. Now, not all of them will support human life, but what the current estimate is, is that just in our galaxy, there will be over 300 million planets that are capable of supporting human life. Wow. What an exciting future.

Thank you very much. And thank you to CommBank's Women in Focus team for having me as their guest speaker today.