

Praise for *Converge*

Dr Catherine Ball doesn't just describe our future challenges and potential solutions, she brings them to life with a clarity and urgency that's impossible to ignore.

Professor Brian Schmidt AC, Nobel Laureate; Vice-Chancellor and President, Australian National University

From Big Data to FrankenFoods, from Spacecations to the Metaverse, Catherine Ball takes us on a wild ride into our future.

Adam Spencer, broadcaster and University of Sydney Ambassador

Finally! A book that shows us the opportunities that tech and humanity can embrace, rather than the battle of who wins. Catherine takes us on a broad and deep tour of the rich tapestry that might be the future – if we dare to believe.

Dom Price, work futurist, Atlassian

Catherine has a unique ability to synthesise the advances in technology into a compelling vision of what our future could hold.

Kylie Ahern, CEO and Founder, STEM Matters

Who better to predict our future than someone inventing it?

Professor Toby Walsh, UNSW Laureate Fellow, world leading researcher in artificial intelligence and author of *Machines Behaving Badly*

For those of us not interested in toys for boys, this is a compelling book about the brilliant technology we all really need for a better future.

Robyn Williams AO, host of ABC Radio National's *The Science Show*

A provocative and intellectual force, Dr Cath hands us confronting facts about the future and asks the greatest question of all – what part do YOU want to play?

Andrea Clarke, author of *Future Fit*

In an increasingly complex and often disturbing world, the sensible calls to action in this book remind us there are achievable ways of taking greater responsibility for steering towards a more positive collective future.

Professor Katherine Daniell, School of Cybernetics, Australian National University; Chevalier, Ordre national du Mérite

I couldn't put this book down, and I'm sure you will feel the same once you open to the first page. Thanks, Cath, for sharing your brain!

Professor Sarah Pearson, Non Executive Board Member, Global Innovation Fund; Member of ANU Council

Converge is a shocking but necessary reminder of how asleep the world is, coupled with a motivational and clear way to wake it up. I'll be thinking about *Converge* for a long time to come.

Sarah Bartholomeusz, author and entrepreneur, You Legal Pty Ltd

A fantastic and timely book by one of the industry's premier leaders.

Adjunct Professor Alex Antic, RMIT; Executive Board Member,
Global AI Ethics Institute

Dr Catherine makes complex topics easy to understand. Water-cooler conversation is about to get 100 times nerdier.

Amanda Johnstone, CEO of Transhuman

This is a rollicking read from start to finish. Catherine relates an optimistic future despite the challenges of complexity, uncertainty and disruption.

Associate Professor Sarah Kelly OAM, Marketing & Law,
University of Queensland Business School

Converge is a much-needed reminder that while technology will change the future, exactly how it does that is up to each of us.

Lorraine Finlay, Human Rights Commissioner,
Australian Human Rights Commission

This is powerful, purposeful and written by a proven futurist standing tall to guide us safely to what is conceivable in our ever-evolving future.

Yasmin Grigaliunas, Founder, World's Biggest Garage Sale and Circonomy

Dr Catherine Ball is a true storyteller, and it's refreshing to read her perspectives on how we may just need to look at things a little differently to make immediate and permanent positive change.

Vanessa Garrard, serial entrepreneur, EY Australian Entrepreneur of the Year

Converge carves out the human-centred future where technology augments and enables the human experience. The future is not scary; it's diverse and exciting.

Anne-Marie Elias, Fellow, Innovation & Entrepreneurship,
University of Technology Sydney

The future is already here. If you want to know what it looks like, *Converge* is an excellent place to start.

Mark Pesce, author and futurist

CONVERGE

A futurist's insights into
the potential of our world as
technology and humanity collide

Dr Catherine Ball



MAJOR
STREET

To my Auntie Arlene, who I miss every day.

*Thank you for being the best a human can be – a protector of children,
a guide, a warrior, an example to me. Thank you for always being
there, and for helping me create the future I wanted for myself.*



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'It is never too late to be what you might have been.'
– Attributed to Mary Ann Evans, aka George Eliot
(a fellow writer from Nuneaton)

Foreword

I grew up in Iran, watching *Star Trek* dubbed in Farsi. I loved the tagline ‘to boldly go where no one has gone before’. I loved the show because it portrayed a society that had all its needs met and now was in pursuit of knowledge and exploration. I thought to myself, ‘This is the future of humanity’.

What I saw on the TV screen was a vast contrast to what I saw outside my window. The world was not just or equitable; food and basic needs were not easily obtained; and if you got sick or broke your arm, it would take months to heal or get better, if at all. But I was a hopeful child with a curious and imaginative mind, and I would fill my free time with reading my Golden Series book on Madame Curie and invention of the X-ray machines, or Jules Verne’s *From the Earth to the Moon* or *Twenty Thousand Leagues Under the Sea*. In my child’s mind, the world of *Star Trek* was all possible and around the corner.

Science was core to my world – it was how I would find answers to thousands of questions that always swirled in my head: ‘Why is the sky blue?’ ‘What are stars made of?’ ‘Are we alone in the universe?’ ‘How did the universe come to be?’ ‘Why are we here?’ The questions never stopped. Some were answered, and some are still unanswered questions swirling in my mind.

As I grew up in the 1970s, pace of change seemed much slower than what I imagined it would be. The world around me was changing, but not in a significant way. The world was not going in the direction

of the *Star Trek* world I had fallen in love with. Instead, we had war, death, disease and famine.

As I immigrated to the US and became an engineer, and a tech entrepreneur in the 1980s and 1990s, I was more convinced than ever that we can solve all sorts of problems and answer so many questions with the tools that science provides us. The world around me was changing but it was still far from that *Star Trek* utopia. As an entrepreneur, I was able to look into the future and get inspiration from it. I would imagine and build solutions and technologies to move us one step closer to that future.

It was during this time that I became involved with the XPRIZE foundation and, with my family, sponsored the first competition that catalysed the creation of a whole new commercial space economy and a new era of access to space for humanity. I got my chance to fly to the International Space Station in 2006 and see our world from a vantage point that only about 500 human beings have experienced. That vantage point brought all those questions back, swirling in my mind, but this time with a sense of belonging to a special place in our universe: our home planet, Earth. It also made it clear in my mind that if we want to explore out there, we need to fix our problems down here.

My serendipitous collision with XPRIZE gave me an opportunity to do just that – to help fix our problems down here, while opening our path to explore out there. The mission of XPRIZE was my mission: to build a hopeful and abundant future for *all*. It was to build my *Star Trek* future. As a tech entrepreneur, I knew the solutions were out there, in every corner, in the minds and hearts of people living their lives, not thinking about the problems or believing that they could solve them. XPRIZE was the platform to focus this cognitive energy of the world on solving the most important problems we face, with a hopeful vision toward a desired future of our own making.

Foreword

Dr Catherine Ball is one of those visionary futurists in our XPRIZE network of experts, helping to envision this desired future. She understands full well the positive power of technology and the potential destructive uses of it, as she describes both sides of the coin in many different industries and technologies in this book. In today's fast-changing world, where convergence of many technological changes is happening at an exponential rate, the future is unpredictable and, for some, even incomprehensible. It is only our belief in the goodness deep in the heart of humanity that helps us look beyond our past mistakes, and the greed that has driven our world toward the cliff of existence, and know that we can choose differently.

Converge is an invitation to be curious and open-minded; to understand and explore all the changes that are happening around us in our world, and their potential; and to choose to build a better future. It is an invitation to care about and demand change in the way our systems look at and value risk. It is an invitation to put humanity and its long-term wellbeing at the center of our future designs, instead of short-term profit. It is an invitation to see the potential we have and to go where no one has gone before...

Anousheh Ansari
CEO, XPrize

The future is already here...

... and it's the end of the world as we know it.

I am a human 3D printer: I make people. (I have two sons.) I am a creator and consumer, a resource user – and a privileged one at that. With current technologies, the rate of my consumption is more than one planet Earth can handle. And there is no Planet B.

I am also a scientific futurist. From a drone's-eye view, I see endless potential every day. I believe the future flies. The future is interconnected. The future is powered by purpose. The future is an incredible place.

The future is convergence. It's characterised by fast combining, evolving and hybridising technologies. There are patterns and predictions being touted as prescience, but I most enjoy seeing the complex made simple – the human applications of technology that demonstrate the very reason technology exists.

To think like futurists, we must find our inner Yoda: 'Always in motion, the future is'. We must unlearn what we have learned about the world and allow our brains to dream of what the future might be, without the constraints of the current reality holding us back. We must empty our knowledge cups so that we can process new ways of thinking and novel information, free from the bias of our experiences.

How do we find the precarious balance between technological capability, ethical obligation and fiduciary responsibility? Our current global economic systems place value on things that our grandchildren will have to pay for and our planet can't sustain. We are the only

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species that knowingly spoils its own nest, and we seem unable to break free from our addiction to consumption.

Separated by 150 years, two blokes – Thomas Robert Malthus and Robert Solow – had very different thoughts about how our society would collapse (or not). Malthus was a demographer and economist whose staple concept of the self-destruction path of Homo sapiens was the ‘Malthusian trap’: humans had conquered agriculture and were able to grow enough food to feed themselves, but that led to population growth, which in turn created a higher demand for food. That then led back to famine from feast, eventually causing inequality and poverty. Eventually, he theorised, we humans will outgrow our capability to produce enough food, and society will collapse when Mother Nature can’t give or take any more.

On the other hand, economist Solow’s nonlinear economic model argues that technological advances will always keep us free from the Malthusian trap. In other words, humans will constantly advance technologically in order to outpace any potential threat to our survival. When Solow created his more optimistic model in the 1950s, he couldn’t have possibly dreamed of the technologically advanced and driven society that we currently live in, but he guessed something like it was coming.

In the end, it comes down to what we want to believe. Is our species going to overpopulate and destroy our planet? Will Mother Nature fight back? Will we have an opportunity to make different decisions? What do we need to change so that every human can reach their full potential while using only a sustainable allocation of resources?

Human crises circulate, like fashion. The COVID-19 pandemic is flavour of the month as I write this. Everyone likes to refer to the last biggie, the ‘Spanish flu’ (which was actually first detected in Kansas, USA), and to the economic recovery in the roaring 1920s and all the hope and life-affirming growth that came with that. Now we are in the 2020s and in a place we never thought we would be in again: a microbe

The future is already here...

has brought our health systems, economies and societies to their knees. Were we arrogant to think that this wouldn't happen again? With our climate having changed, and with our war on biodiversity and wild spaces, we are actually more at risk from pandemics now than we have ever been. How can we plan for what is possible? Well, that is the kind of conversation this book has been written to cultivate at dinner parties, around the water cooler and on group video calls.

The future is already here – it's just in pieces. The privileged societies of the West have early-bird access to it: from medicine to food, travel and technology. Equity and equality are ever-growing issues as the digital divide widens. If we don't use all our human ingenuity, we are never going to get ourselves out of the dilemmas we face.

In the face of an increasingly commercial and technology-driven world, we need to start doing things that only humans can do. We are really good at creativity. We can develop ideas about the way we want to live our lives, and how we might use technology and other advances to become healthier and more fulfilled. We don't want to sit like robots in front of computers, typing away in mundanity without curiosity. Let the robots do the robotic stuff, and let us be more human.

Change in business culture is slow. 'This is the way we have always made profit'; 'This creates a low risk for shareholders'; 'This has been assessed by a risk committee' – these are the types of statements used to justify expensive and short-sighted economic management methods. Business staples won't change without us generating the need or desire for them to change. There is an unpredictable, intangible and unmodellable opportunity cost in not taking advantage of new and emerging technologies and the opportunities they bring. However, unless there is a tangible driver – such as workplace health and safety, or the risk of fines for inaction – there is little to spur change in how business operates. The climate emergency and the spate of legal actions that have commenced against big corporations regarding their carbon

footprint has been an interesting start to the next wave of change as we move from the fourth industrial revolution to the fifth.

There will always be gnarly, seemingly impossible problems gnawing at the belly of all we hold dear. There is always an unjust war waging somewhere; there are myriad threats of ecosystem damage, acceleration of species extinction, destruction of wild places by ferocious fires, overconsumption of resources, the plastic problem, overfishing, melting ice and increased demands on finite resources.

But it isn't too late.

We can turn this around with the Solovian approach of nonlinear progress, utilising technology to save us from the brink. Nothing in nature fits neatly into a straight line. When looking to predict the future, we have to think about levers and tipping points rather than a linear continuum. We need to ask what's possible, what's probable and what's preferable.

We can write our own future, to a certain extent. What's preferable to many may be poisonous to others. That is the beauty and the curse of democracy – we allow for differences of opinion and for outliers. But the numerous problems we are facing are not insurmountable if we solve them together. Inequality should be a thing of the past, but it's hard to convince people that they need to 'decolonise' their thinking. Our systems aren't perfect – we can always do better. Innovation starts with conversation, and a reminder that we have two ears and one mouth. Wouldn't the world be a better place if we listened to understand rather than respond?

This is where you come in, dear reader. With fake news often overpowering science communication in the media, many people are craving insight into the overwhelming rise of technology around them. There is a global issue around literacy in science, technology, engineering and mathematics (STEM). This really needs to change – fast. Everyone deserves a chance to get educated, get involved and help curate technology, and to contribute to the conversation around

The future is already here...

how to adopt it and what we should be wary of. Picking up this book is a great start.

In the following chapters, you'll be taken on a roller-coaster ride into the future. Keep your arms inside the carriage at all times. Whether you view it as a terrifying ghost train or a gravity-defying thrill ride is really up to you. Technology is neither good nor bad – it is how it is applied that matters. How we live, the choices we make, how we want our politicians to represent us, and the manner in which we regulate the companies making use of the future is all up to us. We have choices about how we consume, how we communicate and how we determine what is valuable.

All my written works on the future are love letters to my sons, because the future is theirs. I just hope we leave them a good one.