

FUTURE NEWS

TO CONNECT, TO INFORM AND TO INSPIRE

IN THIS EDITION

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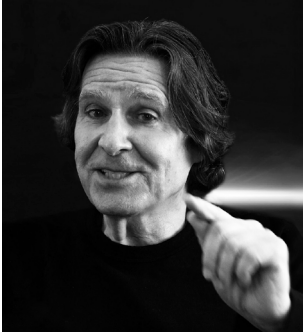
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CAN WE REBRAND THE FUTURE

by Chris Nolan



Chris Nolan is a multiple Emmy winning director-writer, author, story + branding expert. His latest film is *It's VUCA: The Secret to Living in the 21st Century*.

In 1975, New York was a crime-ridden, nearly bankrupt metropolis with garbage piling up on sidewalks. It certainly wasn't a tourist destination but more akin to the dark dystopian Gotham City that inspired the Batman movies.

In a last-ditch effort to avoid bankruptcy, the city turned to President Gerald Ford — who famously told the city to “drop dead”. It was that bad.

Now on its own, NYC had to find a way to flip the script and promote a more positive image. So it turned to Madison Avenue for help. Not surprisingly, most agencies passed thinking the city was too far gone.

Everyone except for two brave women, Mary Wells Lawrence who ran Well, Rich and Green Advertising and Jane Maas the real-life inspiration for Peggy Olson in “Mad Men”, who set out to re-brand a city like a product.

The result was the famous “I Love New York” campaign which completely changed the city's story and bad reputation. Overnight, NYC became a tourist mecca.

Ten years later Chiat/Day, the Los Angeles ad agency I worked at, would orchestrate the same rebranding idea for its hometown. In the 1980s, L.A. was a smog-filled city with tense race relations — certainly not the food, fashion, and arts mecca it is today. The “I Love L.A.” campaign featuring the Randy Newman song of the same name celebrated its unique neighborhoods and cultural diversity helping to change it into the vibrant city we know today.

FLIPPING THE SCRIPT

We live in world shaped by our stories. The stories we tell reinforce our perceptions and shape our reality. Marketers know this. It's what a brand strategy is all about. We craft a brand story to trigger how a product is perceived and that becomes the brand identity.

The two big filters that inform our perception are goals (dreams) and fears. Goals and fears are the essence of stories from a biologically and evolutionary perspective. They are also the essence of branding.

In the same way, the stories we tell reinforce and shape our culture and our future. If they amplify fears they exacerbate anxiety, worry, and uncertain mindsets. If they are positive, they trigger hope and inspiration.

Marketers also know how negative stories can erode trust fast. Australian business story expert, Shawn Callahan, explains that for every negative story you need a lot more positive ones to counteract its effects.

We now live in a time that some have called the golden age of dystopia. A continuous dose of fearful stories have created millennial Preppers (a person who believes a catastrophic disaster is likely to occur in the future and makes active preparations for it) and other Armageddon mindsets.

To overcome the impact of dystopian storytelling, we need to rebrand the future as though it were a product. Or in this case a product of our imagination. American futurist Barbara Hubbard would add, “As we see the future, so we act and as we act, so we become”.

My friend and partner in the Good Future Project, Futurist Gerd Leonhard, talks about two possible future scenarios. In his wonderful video entitled “Twice Upon a Time. Our World by 2030”, he theorizes that mistrusting the future makes it very hard to give up the past and the present which makes it difficult to move forward.

It’s also important to factor in some neuroscience here. The brain tends to embellish and exaggerate fears and traumas. Like watching a film, the brain gets creative and fills in the blank frames of things we don’t understand or are uncertain of. In fact, studies show that fifty percent of what we think or say about our past is made up. Which means you might actually be living a story that’s not real.

What’s more, we continually look for proof in order to confirm that story. It becomes our belief and behavior. If we feel like a victim, then we will look for ways to reinforce that belief. And these half-truths become our attitudes, perspectives, and our identity — both individually and as a society.

As historian Yuval Noah Harari tells us, “Just as individual humans get caught up in the stories they invent about themselves so do entire societies, cultures, and nations.

TALE OF TWO FUTURES



“It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of light, it was the season of darkness, it was the spring of hope, it was the winter of despair.”

— Charles Dickens, *A Tale of Two Cities*

The famous opening paragraph of *A Tale of Two Cities* is based on the perception of the times. The best and the worst. It’s an apt phrase to describe the context of where we are today. You might call it *A Tale of Two Futures*.

So is it the best of times or the worst of times? Is it an age of incredible knowledge, amazing technological breakthroughs, and abundance? Or one of climate change hubris, global inequity, distorted social media, and unethical technology?

Of course, our modern world is unlike anything Dickens could have imagined. In the author's day, time was linear and local with everything a day's walk with a person's life typically marked by a few notable events. Today, everything is global and accelerating at massive exponential speed. It's an era I call VUCA MAX during which an estimated 250 years of change will take place in just ten years.

But Dickens also understood that the stories we tell create our future. In his writing, he approached technology with hope in its ability to magnify human power, to provoke dreams, and ignite spiritual meaning. He believed that technology's true utility set the future apart from the greed, the wastefulness, and the pollution of mainstream Victorian society.

In fact, on the whole, the generations before us generally celebrated future progress with awe and wonder. Whereas today, people around the world question the future and even dread it.

70% of young people under 40 years of age feel humanity is doomed and more than three-quarters of adults (76%) feel the future of America is a significant source of stress. Never in human history has the faith in the future been so uncertain.

But the fact is the world is getting better and better every year with a compounding effect creating what Kevin Kelly, founder of WIRED magazine, calls "A continual progress toward a better world or — Protopia".

Indeed, the future is actually much better than we think.

Exponential converging technology is transforming scarcity and poverty into an age of abundance. Energy and water are becoming cheap, clean, and safe. As the cost of energy continues to drop, vertical farming and desalinization will become commonplace further accelerating the eradication of hunger.

Ubiquitous AI and robotics are not replacing humans but expanding human potential, longevity, completely connecting the world, and accelerating innovation to solve the planet's greatest challenges. Billions of people around the world who once lacked access to quality education can now create positive change for their families and communities.

Protopia is leading to an era where human capabilities and connections will increase a thousand fold. An age that futurist Peter Leyman foresees as a new age of Enlightenment. And epoch of not just mind-blowing technology, but a human renaissance.

STORIES ARE A SELF-FULLFILLING PROPHECY



Today, Iceland has 100% renewable clean energy and a thriving eco-tourism business. There are seven times more tourists than locals. But, it wasn't always like this. In the 1970s, Iceland was dependent on imported coal and oil. To say the least, it was not a big tourist destination.

The change didn't happen overnight. But it started with a new story that Iceland could be a model for clean sustainable

energy with the help of a profound and unified vision, huge adjustments, and realigned investments.

Change for the better can be uncomfortable. It can be frustrating and seem impossible. And it takes commitment. But ask Iceland if it's worth it.

Again, if you have the right story, you can rebrand a city, a country, and even a planet.

YOUR FUTURE SELF IS A STRANGER

"The future ain't what it used to be." — Yogi Berra

Another reason you might be having such a hard time perceiving a positive future is because there's a stranger in it. And it's you!

Jane McGonigal a futurist at the Institute For The Future explains, "It's a neurological fact that when you think about yourself 10 years in the future, your brain treats the person that you're thinking about as someone you've never met".

Take a moment to imagine yourself in 2035. You'll probably see your future self as someone you don't know so, as a result, you don't think as much about the future as you should. This is why many put off saving or planning for retirement.

This is due to a glitch in our medial prefrontal cortex, the part of the brain that tells you the story of who you are. But if that part of your brain treats your future self like a stranger, how can you convince yourself to care more about a future you? Or the future of the planet?

How do we build courage and overcome the fears of an uncertainty tomorrow? How do we acquire a future mindset in order to shape our future story on our terms? One way is to be aware of the story we are feeding ourselves right now.

FEAR WOLF AND THE COURAGE WOLF



A Cherokee elder proclaims to his grandson, "A terrible fight is going on inside of me. It's a fight between two wolves: the fear wolf and the courage wolf. The fear wolf is full of negativity, mistrust, lies, and hopelessness. The other wolf is full of positivity, trust, love, and hope." The grandfather looks at his grandson. "This same fight is going on inside of you."

Upon reflection the boy asks, "Grandfather, which wolf will win?" The elder Cherokee replies, "The one you feed."

In contemplating this folktale, we can see the connection to the story we tell ourselves individually and collectively. And the story we tell ourselves has more power to create a brave, bold, positive world than we may think.

Sure, we can get beaten down by the dark narratives, the trauma of the pandemic, climate Armageddon, worries about global and economic turmoil, dread of relentless disruption and the dark thunderstorms of unceasing change and turmoil.

Yes, we can become overwhelmed, paralyzed, and let the fears of the future fill in the blank frames of uncertainty with a narrative of negativity that becomes our frequent mindset.

Or we can starve the fear wolf and feed our courage wolf — which is very hungry.

There are always multiple possible future scenarios. We need to ask ourselves what is our preferred future? What is the story we want to feed ourselves?

THE FUTURE IS A MINDSET

“If you change the way you look at things, the things you look at change.”

— Wayne Dyer

Kevin Kelly also tells us: “It is extremely difficult to create a desirable future without first envisioning it. To imagine is really the first step in creating anything. Therefore, an essential chore for making a future we want to live in, is to imagine what it is like and how we get there”.

So how did New York City get there? By inspiring people, sparking their imaginations, and reminding them what was positive and exciting: Broadway, Central Park, the Iconic skyline, the city that never sleeps...

Soon, Woody Allen would write a movie love poem to the city entitled “Manhattan”. Martin Scorsese would direct and produce “New York, New York”. And Frank Sinatra would start spreading the news singing, “I want to be a part of it — New York, New York”, a song that revived his career as well as the city’s renaissance.

British philosopher James Allen wrote: Dream lofty dreams, and as you dream, so shall you become. Your Vision is the promise of what you shall one day be. Your Ideal is the prophecy of what you shall at last unveil.”

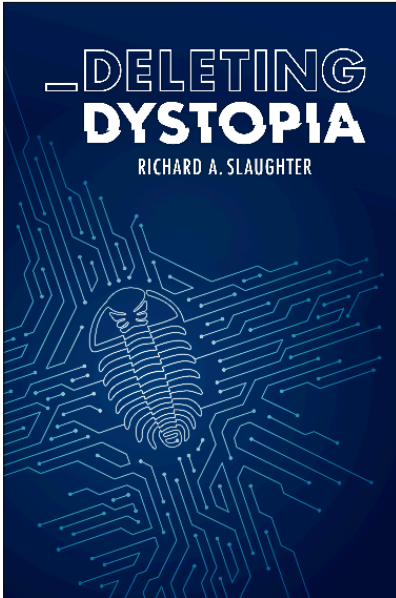
So how do we dream lofty dreams that become the ideal prophecy of a desirable Good Future?

In this case, the first step is a worldwide campaign; an international movement of countries, companies, world leaders, influencers, celebrities, and people of all generations coming together to share how we perceive tomorrow.

To start the ball rolling, we have created “The Good Future Project”, a consortium and coalition of futurists and thought leaders with the ambitious mission to re-brand the future.

The Good Future Project (TGFP), founded by Futurist Gerd Leonhard and supported by the Futures Agency, is a global, non-profit network of like-minded individuals and creators who focus on making ‘The Good Future’ a reality. TGFP’s concept is based on Gerd’s 2021 film ‘The Good Future’. The project’s blogs, video-channels and live-stream sessions serve as a platform for experienced contributors and as a space for planting the seeds of change, exploring what a ‘Good Future’ might look like, and gathering momentum to making it a reality. Together, we explore three core topics (see below) that we believe encapsulate the key challenges and opportunities, and focus our efforts on starting a movement that *changes the narrative* of how we see the future, and propels us to create it. More details at: <https://thegoodfutureproject.com>

Deleting Dystopia by Richard Slaughter



This book offers a critical examination of the information technology (IT) revolution in the early twenty-first century. It investigates approaches to comprehending the danger, envisioning remedies, and finding tactics that move away from digital authoritarian futures and toward those based on humanly feasible values and practices. It promotes a paradigm shift away from passively accepting the ideas of reality tenaciously propagated by Silicon Valley and its agents and toward a whole other reality. By ethical principles, the book aims to express its author's integral worldview, arguing that any attempt to design the future on structurally defective and empirical interpretations of reality is, at best, imprudent, and virtually likely a prescription for catastrophe. Scholars and students interested in the human and social ramifications of utilising technology, particularly IT, can benefit much from this book.

Book Review

by Alireza Hejazi

Prof. Richard A. Slaughter is a Futures Studies and Applied Foresight practitioner, writer, and inventor with a focus on Critical and Integral Futures. He is the author and editor of several publications on a wide range of futures themes, as well as the author or editor of several volumes, including *The Knowledge Base of Futures Studies* (2020). He has received three Association of Professional Futurists awards for 'Most Important Futures Works.' In 2020, he was invited to join the Professional Studies team at University of Southern Queensland on a part-time basis.

Slaughter (2021) reminds readers in this book that the IT revolution has brought many shocks. Among these is the fact that powerful digital oligarchies have amassed vast amounts of personal data through extensive monitoring. Accounts of increasingly authoritarian applications of technology, and the resulting dumbing down of entire populations, in his opinion, cast shadows over our collective prospects that are beginning to appear increasingly dystopian. Slaughter believes that the existential threats caused by heedless innovation and poorly regulated enterprise endanger all human cultures and societies.

He cautions readers that the existential hazards presented by the abuse of modern digital technology are genuine, organising his views into the seven parts of this book. Instead

of indifference and fatalism, Slaughter investigates methods of comprehending the threat, envisioning remedies, and creating tactics that move away from digital authoritarian futures toward those founded on humanly productive values and behaviors. Not only as an astute futurist, but also as a human being, his career is a never-ending quest for meaning. In other recent work he reminded professional futurists of their unavoidable obligation to safeguard and nurture natural and cultural heritage, both of which are under-sustained and under-appreciated

In the first chapter of this new book, he picks up the tale in the early 2010s from the perspective of many competent observers. It is a good place to start since this is when genuine questions about 'where the IT revolution was headed' began to surface, along with a number of significant underlying concerns.

In the second chapter he examines three related themes that require serious critical attention: the Internet of Things, the potential of autonomous automobiles, and rising concerns about what was happening within the glossy but secluded world of Silicon Valley. Slaughter's summary of Zuboff's (author of "The era of surveillance capitalism") major concerns makes sense since she, more than any other, has brought new levels of clarity to reveal just what surveillance capitalism is and how

it works. Her early critique of what she referred to as “the big other” predates her more in-depth work on the subject by several years. Even so, it helped to establish a new stream of informed understanding and greater clarity that later emerged in her masterwork. Since Slaughter regards language as one of the keys to in-depth knowledge and understanding, a glossary of some of her key concepts and phrases has been helpfully included in the appendices.

Slaughter’s attention moves to many broadly defined categories in chapter three, which help to outline viable answers. Since the concept of compulsive innovation is central to this project, the first section examines some of its present and potential future manifestations. Next he examines rationales for viable solutions under a range of topics before concluding with a brief examination of values and moral growth. These issues, far from being arcane esoteric matters, illustrate another aspect of the book.

Science and technology, according to Slaughter, reflect the values, institutions, regulatory systems, and culture of the society in which they exist. He suggests that contemporary uses of digital technology are deceptive and diversionary. In this view, the term ‘technology’ cannot merely be restricted to a narrow collection of physical objects but should also include the networks and broader social and cultural environments from which they emerged. For these and other reasons, he believes that powerful new technologies cannot but have unanticipated and unintended consequences.

Toward the conclusion, the author draws on the preceding to suggest a framework for understanding our current position. His goal is to shed light on some of how the existing system wields power and influence over whole communities, to their immediate and long-term disadvantage. To do this, he introduces four witnesses to this “revolution”. These are persons who have each had meaningful and direct experience of some of the key topics in one way or another. They collectively provide a varied, yet cohesive assessment of the present state of play. They tend to reinforce the view that, while conventional utopias may have passed us by, the contours of a technological dystopia are now taking shape around us. Slaughter comes to a variety of conclusions in the final section. He notes the important work currently being done by others and proposes a two-pronged reaction to the current dominance of ‘Big Tech.’ This includes government efforts to impose different types of regulation, as well as growing funding for civil society, sharing cities, community start-ups, and the like. He argues that both multi-initiatives are necessary to wrest market share from the oligarchs by providing similar or superior services based on defensible, clearly stated human and community values rather than the traditional capitalist imperatives of profit and exploitation.

As Slaughter points out, this is important work in and of itself, but it is also essential in light of other grave dangers to humanity. Dystopian accounts of the occurrence of oligarchies’ dangers, unrestricted technological growth, and the dumbing down of humans by computers appear in both

fictional and nonfictional works. Other evidence continues to emerge suggesting mankind is on a profoundly unsustainable path that also constitutes an existential threat. Given the likely consequences of IT-driven initiatives, Slaughter’s book should be seen as a timely warning.

CONCLUSION

By authoring this book, Slaughter has clearly not contributed to, or supported, fatalistic “gloom and doom” narratives. Rather, he suggests that the dangers highlighted by dystopia are best viewed as warnings that help motivate us to take immediate and effective. His book is about overcoming the personal and social factors that together separate us from some of the deeper and more productive aspects of human existence. To achieve these ends, he proposes a practical shift away from what is already a “failed future.” This shift is divided into two sections. The first is to completely deny the internet oligarchs continuing social acceptance. The second path, which has its champions and start-ups in the works, is to transfer or duplicate the most socially useful parts of their operations from closed private infrastructures to a variety of civil equivalents, each equipped with appropriate codes of practice and operating solely in the public interest. Both routes create opportunities to reset and rethink the whole technical environment. Overall, *Deleting Dystopia* promotes the creation of an international IT system that is benign, effective, respectful, and safe for all valid needs or purposes.

FUTURISTS IN ACTION

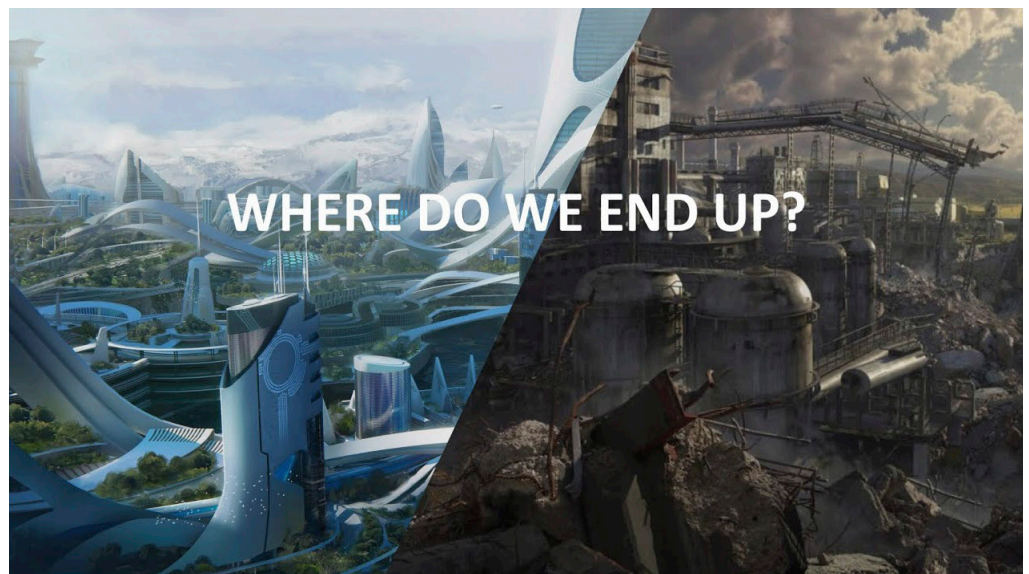
SCIENCE FICTION AS A FUTURIST TOOL

by Klaus Mogensen



Klaus Mogensen – Senior Researcher and futurist – Copenhagen Institute for Futures Studies

By playing into our subconscious hopes and fears, envisioning utopian and dystopian futures helps us better understand where we are today, and where we want to go tomorrow.



Through the medium of science fiction, we are transported to strange and foreign worlds that are distorted mirrors of today's world or visions of possible futures, good or bad. The science fiction visions that resonate most with us tap into our conscious and subconscious desires and anxieties about the future. For this reason, popular science fiction in books, on TV, and in movies can tell us much about what exactly these hopes and fears are. In this way, examining utopian and dystopian science fiction visions – and science fiction in general – can be used as a futurist tool.

Utopias and dystopias are fictional visions of societies that are portrayed as being significantly better or worse than today's world. Utopias and dystopias are generally, but not always, placed in the future, whereby they become explicit hopes for or warnings of what might happen. They often exaggerate or expand on trends seen today and tell us what benefits or horrors these trends could give birth to. Future visions need not be realistic to spark such hopes and fears; for instance, being gripped by a tale of a zombie apocalypse may reflect a deep-rooted fear of social dehumanisation or of an uprising of “the great unwashed” – or it could reflect a hope for more tangible and combatable evils than those which plague us today. Similarly, a fantasy featuring elves living in elegant buildings in harmony with nature may reflect hopes of our own society becoming more like that, even if we can't become elves.

Fictional futures can serve as explicit or implicit warnings of paths we should not take, or suggestions for desirable paths we could take (according to the

writer), and hence also serve as political commentary on present trends; but they can also simply be worlds that work differently from ours, and hence make us question things we take for granted today by showing possible alternatives and thereby making us reassess the choices we have made. A utopian vision like the one we see in Star Trek lets us imagine that we can achieve a bright society free of poverty, oppression and intolerance, with authorities that serve all people based on lofty ideals about freedom, equality and cultural respect, where every man or woman (or whatever) can become their own best self, no matter what their race or background. It may not be a perfect world – many Star Trek stories centre around dilemmas that have no easy solutions, and there are examples of corrupt officials – but the overall system strives to do the best it can, and, ultimately, it usually manages to solve any serious problem. Star Trek is a totally realistic world.



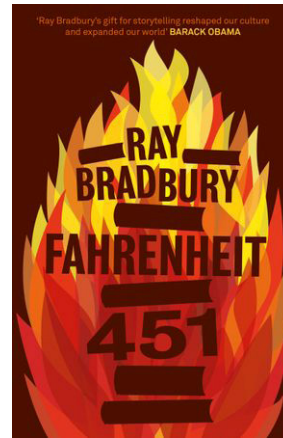
Technologies like faster-than-light travel, artificial gravity, solid holograms and matter transporters are still beyond all but the most hypothetical physics, though other technologies like replicators, androids, and universal translators may soon become practical reality. But the realism of the setting is not all that important; what matters is that Star Trek shows us a world that most of us perceive as better than the one we live in, maybe inspiring us to change our world today to become more like that.

The flip side of the coin, the dystopian visions seen in, for example, Robocop, The Terminator, Blade Runner, Hunger Games, Gattaca, The Day After Tomorrow and The Handmaid's Tale, warn us of dangerous missteps we could take on our road to the future if we are not careful, whether it is technology run amuck, extreme inequality, catastrophic climate change or religious oppression.

As with utopias, dystopian visions need not be realistic to represent real fears. Climate change is unlikely to happen as rapidly and brutally as shown in The Day After Tomorrow, but the fear of climate change is real. It may not be realistic that future robots will decide to take over the world, as in The Terminator or I, Robot, but the fact that such visions speak to us highlights our fear of future technology running out of control. Or, perhaps less obviously, the robots in The Terminator might represent our fear that inhuman corporations will destroy the world, following their own agendas without thought for the human cost (totally unrealistic, of course).

As we can see from the above, science fiction visions should not always be taken at face value. There may be deeper meanings relevant for today, whether or not the writer consciously sought to imply such meanings. H. G. Wells did not write The War of the Worlds as a warning about invasions from Mars, but rather as criticism of the colonial actions of the British Empire of which he was

a part; a criticism that has been lost on many readers and in most adaptations. On the other hand, Ray Bradbury stated that he wrote *Fahrenheit 451* as a criticism of television and was surprised that people saw it as a warning about censorship. The allegorical nature of the work allows both views, and this is the strength of science fiction: it doesn't necessarily tell you what to think, but rather leaves it up to you to draw whatever parallels you want.



This power of allegory is even stronger in science fiction's sister genre, fantasy. The dark forces in Tolkien's *The Lord of the Rings* can be seen to represent fascism, and indeed, Tolkien wrote an early draft of the story as letters to his son who served in Africa during World War II; but a deeper reading of the story indicates an unspoken criticism of industrialisation and the cost of progress (loss of beauty and wonder is a recurring theme). When examining a fictional future or fantasy setting, it is hence important to be aware of both explicit and implicit themes that can be read from it.

There are several ways that science fiction utopias and dystopias can be used as tools in futures studies. The most obvious is that futurists should be aware of a wide selection of popular utopian and dystopian future visions, both for the insights the imagined future scenarios can give and because the popularity of the works means that they can be used as a shorthand for describing the possible effects of trends. Whenever a new technology allows more surveillance, George Orwell's *Nineteen Eighty-Four* is brought up as a possible consequence, and proposed restrictions on contraception and abortion make us think of *The Handmaid's Tale*.

Utopias and dystopias can also be used in workshop exercises. A selection of future visions relevant to the subject of the workshop may be shown through text excerpts or short video clips. For vision, participants are asked questions like "What are the themes presented here?", "What hopes and fears of today do they represent?", "What does that tell us about today's citizens, consumers, and employees?", "What future innovations – in technology, services, fashion, leisure or social and cultural norms – are presented here?", "What relevant and useful innovations could you create today with this as inspiration?" In this way, the popular works of fiction provide anchor points for discussing future trends and their possible consequences, and they can provide useful inspiration that is immediately actionable.

In another workshop exercise, participants create their own utopias and dystopias. The person running the workshop asks the participants to imagine the best (utopian) and the worst (dystopian) futures that could derive from

extending a selected trend or technology and then imagining what steps and events could lead to these futures. Comparing the imagined paths to the two scenarios can be used to create a roadmap of events or decisions that could bring about one or the other possible future. The workshop can then discuss whether the utopian vision really is utopian – e.g. might there be some more-or-less obvious pitfalls or undesirable side effects? – and whether the dystopian vision really is dystopian – e.g. does it reflect irrational fears or obsolete morals, ethics, or structures rather than anything we should rationally fear?

Fictional utopias and dystopias can also serve as tools in brainstorming on a certain subject or theme. First, the participants silently brainstorm about how this subject or theme has been treated in popular utopias, dystopias or other stories. Then, the participants in turn present such a story and how it treats the subject or theme, after which the group discusses how this might pertain to the current issue or project. After the discussion, useful thoughts and ideas are collected and organised for clarity and presentation.

Fictional portrayals of the future – whether utopian, dystopian or merely entertaining – usually showcase imagined future products, services, social innovations or other ideas. Presenting a number of these could inspire real-world applications. The communicators shown in the original Star Trek series inspired the flip-top mobile phones of the 2000s. In the 1990 movie Total Recall, Arnold Schwarzenegger's character takes a ride in a robot taxi, 'Johnny Cab', and though the scene is rather silly, it might well have inspired more realistic ideas of a robot taxi service. The 'hoverboard' in Back to the Future Part II has inspired many attempts to create something similar, and the word has become a common term for a self-balancing scooter, even if it doesn't actually hover. A future internet application called 'Earth' in Neal Stephenson's popular 1992 novel Snow Crash allegedly inspired Google Earth, and the 'Metaverse' from the same book inspired the popular first-person shooter game Quake, the online world Second Life and Xbox Live. In general, reading or watching science fiction is a good way to be exposed to fictional worlds that are different from the one we live in. The great adaptability of humans has been important for our survival as a species, but it has also made us liable to adapt to less than ideal conditions.

Kids growing up in war zones adapt to war and often find it hard to let go of combat after the war is over. Women adapt to abusive relationships to the extent that they may consider it normal. People growing up in a fundamentalist, communist or capitalist society may take these for granted and become oblivious to alternatives or consider such alternatives inherently evil. For this reason, exposing yourself to science fiction's visions of different worlds may make you see the flaws of the one you live in reflected in the exaggerations of a dystopian vision, or a utopian vision may make you question the ideals, ethics and priorities of today's world. In this way, science fiction becomes a useful part of achieving futures literacy.



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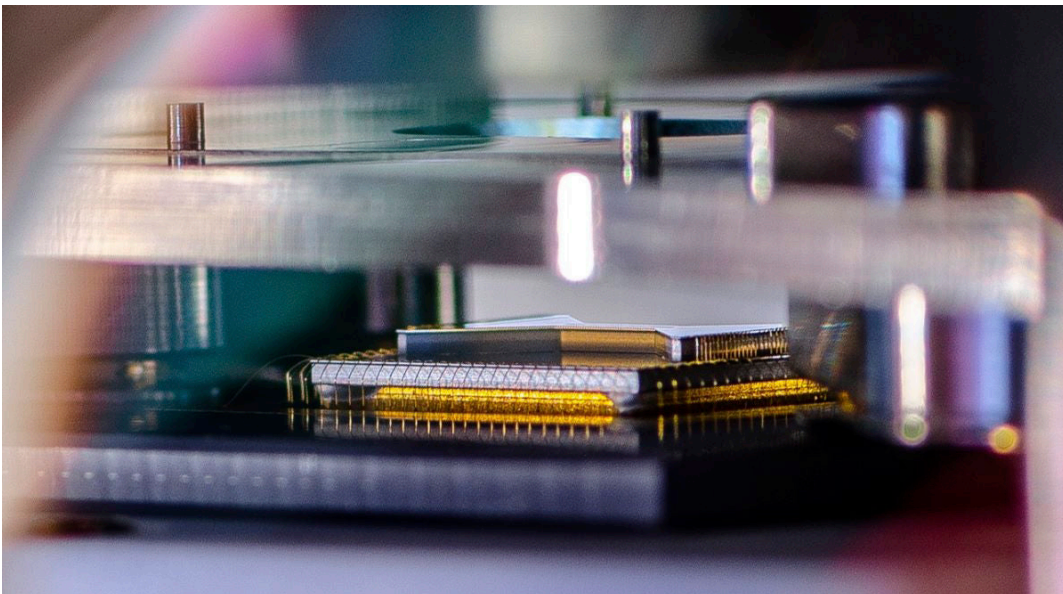
Signals in the Noise

QUANTUM COMPUTERS EIGHT WAYS QUANTUM COMPUTING IS GOING TO CHANGE THE WORLD

by Daphne Leprince-Ringuet



Businesses are already exploring the future potential of quantum computers, and some industries anticipate big changes ahead.



From simulating new and more efficient materials to predicting how the stock market will change with greater precision, the ramifications of quantum computing for businesses are potentially huge.

The world's biggest companies are now launching quantum computing programs, and governments are pouring money into quantum research. For systems that have yet prove useful, quantum computers are certainly garnering lots of attention.

Quantum computers offer great promise for cryptography and optimization problems, and companies are racing to make them practical for business use. ZDNet explores what quantum computers will and won't be able to do, and the challenges that remain.

The reason is that quantum computers, although still far from having reached maturity, are expected to eventually usher in a whole new era of computing – one in which the hardware is no longer a constraint when resolving complex problems, meaning that some calculations that would take years or even centuries for classical systems to complete could be achieved in minutes.

From simulating new and more efficient materials to predicting how the stock market will change with greater precision, the ramifications for businesses are potentially huge. Here are eight quantum use cases that leading organisations are exploring right now, which could radically change the game across entire industries.

Signals in the Noise

EIGHT WAYS QUANTUM COMPUTING IS GOING TO CHANGE THE WORLD

1. DISCOVERING NEW DRUGS



The discovery of new drugs relies in part on a field of science known as molecular simulation, which consists of modelling the way that particles interact inside a molecule to try and create a configuration that's capable of fighting off a given disease.

Those interactions are incredibly complex and can assume many different shapes and forms, meaning that accurate prediction of the way that a molecule will behave based on its structure requires huge amounts of calculation.

Doing this manually is impossible, and the size of the problem is also too large for today's classical computers to take on. In fact, it's expected that modelling a molecule with only 70 atoms would take a classical computer up to 13 billion years.

This is why discovering new drugs takes so long: scientists mostly adopt a trial-and-error approach, in which they test thousands of molecules against a target disease in the hope that a successful match will eventually be found.

Quantum computers, however, have the potential to one day resolve the molecular simulation problem in minutes. The systems are designed to be able to carry out many calculations at the same time, meaning that they could seamlessly simulate all of the most complex interactions between particles that make up molecules, enabling scientists to rapidly identify candidates for successful drugs.

This would mean that life-saving drugs, which currently take an average 10 years to reach the market, could be designed faster – and much more cost-efficiently.

Pharmaceutical companies are paying attention: earlier this year, healthcare giant Roche announced a partnership with Cambridge Quantum

Computing (CQC) to support efforts in research tackling Alzheimer's disease.

And smaller companies are also taking interest in the technology. Synthetic biology start-up Menten AI, for example, has partnered with quantum annealing company D-Wave to explore how quantum algorithms could help design new proteins that could eventually be used as therapeutic drugs.

2. CREATING BETTER BATTERIES

From powering cars to storing renewable energy, batteries are already supporting the transition to a greener economy, and their role is only set to grow. But they are far from perfect: their capacity is still limited, and so is their charging speed, which means that they are not always a suitable option.

One solution consists of searching for new materials with better properties to build batteries. This is another molecular simulation problem – this time modelling the behaviour of molecules that could be potential candidates for new battery materials.

Similar to drug design, therefore, battery design is another data-heavy job that's better suited to a quantum computer than a classical device.

This is why German car manufacturer Daimler has now partnered with IBM to assess how quantum computers could help simulate the behaviour of sulphur molecules in different environments, with the end-goal of building lithium-sulphur batteries that are better-performing, longer-lasting and less expensive than today's lithium-ion ones.

3. PREDICTING THE WEATHER

Despite the vast amounts of compute power available from today's cutting-edge supercomputers, weather forecasts – particularly longer-range ones – can still be disappointingly inaccurate. This is because there are countless ways that a weather event might manifest itself, and classical devices are incapable of ingesting all of the data required for a precise prediction.

On the other hand, just as quantum computers could simulate all of the particle interactions going on within a molecule at the same time to predict its behaviour, so could they model how innumerable environmental factors all come together to create a major storm, a hurricane or a heatwave.

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And because quantum computers would be able to analyse virtually all of the relevant data at once, they are likely to generate predictions that are much more accurate than current weather forecasts. This isn't only good for planning your next outdoor event: it could also help governments better prepare for natural disasters, as well as support climate-change research.

Research in this field is quieter, but partnerships are emerging to take a closer look at the potential of quantum computers. Last year, for instance, the European Centre for Medium-Range Weather Forecasts (ECMWF) launched a partnership with IT company Atos that included access to Atos's quantum computing simulator, in a bid to explore how quantum computing may impact weather and climate prediction in the future.

4. PICKING STOCKS



JP Morgan, Goldman Sachs and Wells Fargo are all actively investigating the potential of quantum computers to improve the efficiency of banking operations – a use case often put forward as one that could come with big financial rewards.

There are several ways that the technology could support the activities of banks, but one that's already showing promise is the application of quantum computing to a procedure known as Monte Carlo simulation.

The Monte Carlo operation consists of pricing financial assets based on how the price of related assets changes over time, meaning that it's necessary to account for the risk inherent in different options, stocks, currencies and commodities. The procedure essentially boils down to predicting how the market will evolve – an exercise that becomes more accurate with larger amounts of relevant data.

Quantum computers' unprecedented computation abilities could speed up Monte Carlo calculations by up to 1,000 times, according to research carried out by Goldman Sachs together with quantum computing company QC Ware. In even more promising news, Goldman Sachs' quantum engineers have now tweaked their algorithms to be able to run the Monte Carlo simulation on quantum hardware that could be available in as little as five years' time.

5. PROCESSING LANGUAGE

For decades, researchers have tried to teach classical computers how to associate meaning with words to try and make sense of entire sentences. This is a huge challenge given the nature of language, which functions as an interactive network: rather than being the 'sum' of the meaning of each individual word, a sentence often has to be interpreted as a whole. And that's before even trying to account for sarcasm, humour or connotation.

As a result, even state-of-the-art natural language processing (NLP) classical algorithms can still struggle to understand the meaning of basic sentences. But researchers are investigating whether quantum computers might be better suited to representing language as a network – and, therefore, to processing it in a more intuitive way.

The field is known as quantum natural language processing (QNLP) and is a key focus of Cambridge Quantum Computing (CQC). The company has already experimentally shown that sentences can be parameterised on quantum circuits, where word meanings can be embedded according to the grammatical structure of the sentence. More recently, CQC released lambeq, a software toolkit for QNLP that can convert sentences into a quantum circuit.

6. HELPING TO SOLVE THE TRAVELLING SALESMAN PROBLEM

A salesman is given a list of cities they need to visit, as well as the distance between each city, and has to come up with the route that will save the most travel time and cost the least money. As simple as it sounds, the 'travelling salesman problem' is one that many companies are faced

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with when trying to optimise their supply chains or delivery routes.

With every new city that is added to the salesman list, the number of possible routes multiplies. And at the scale of a multinational corporation, which is likely to be dealing with hundreds of destinations, a few thousand fleets and strict deadlines, the problem becomes much too large for a classical computer to resolve in any reasonable time.

Energy giant ExxonMobil, for example, has been trying to optimise the daily routing of merchant ships crossing the oceans – that is, more than 50,000 ships carrying up to 200,000 containers each, to move goods with a total value of \$14 trillion.

Some classical algorithms exist already to tackle the challenge. But given the huge number of possible routes to explore, the models inevitably have to resort to simplifications and approximations. ExxonMobil, therefore, teamed up with IBM to find out if quantum algorithms could do a better job.

Quantum computers' ability to take on several calculations at once means that they could run through all of the different routes in tandem, allowing them to discover the most optimal solution much faster than a classical computer, which would have to evaluate each option sequentially.

ExxonMobil's results seem promising: simulations suggest that IBM's quantum algorithms could provide better results than classical algorithms once the hardware has improved.

7. REDUCING CONGESTION

Optimising the timing of traffic signals in cities, so that they can adapt to the number of vehicles waiting or the time of day, could go a long way towards smoothing the flow of vehicles and avoiding congestion at busy intersections.

This is another problem that classical computers find hard: the more variables there are, the more possibilities have to be computed by the system before the best solution is found. But as with the travelling salesman problem, quantum computers could assess different scenarios at the same time, reaching the most optimal outcome a lot more rapidly.

Microsoft has been working on this use case together with Toyota Tsusho and quantum computing startup Jij. The researchers have begun developing quantum-inspired algorithms in a simulated city environment, with the goal of reducing congestion. According to the experiment's latest results, the approach could bring down traffic waiting times by up to 20%.

8. PROTECTING SENSITIVE DATA

Modern cryptography relies on keys that are generated by algorithms to encode data, meaning that only parties granted access to the key have the means to decrypt the message. The risk, therefore, is two-fold: hackers can either intercept the cryptography key to decipher the data, or they can use powerful computers to try and predict the key that has been generated by the algorithm.

This is because classical security algorithms are deterministic: a given input will always produce the same output, which means that with the right amount of compute power, a hacker can predict the result.

This approach requires extremely powerful computers and isn't considered a near-term risk for cryptography. But hardware is improving, and security researchers are increasingly warning that more secure cryptography keys will be needed at some point in the future.

One way to strengthen the keys, therefore, is to make them entirely random and illogical – in other words, impossible to guess mathematically.

And as it turns out, randomness is a fundamental part of quantum behaviour: the particles that make up a quantum processor, for instance, behave in completely unpredictable ways. This behaviour can, therefore, be used to determine cryptography keys that are impossible to reverse-engineer, even with the most powerful supercomputer.

Random number generation is an application of quantum computing that is already nearing commercialisation. UK-based startup Nu Quantum, for example, is finalizing a system that can measure the behavior of quantum particles to generate streams of random numbers that can then be used to build stronger cryptography keys.