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FOUR PLAUSIBLE FUTURES **2050 SCENARIOS**

developed by Arup foresight team

The world today is marked by rapid change. Some trends point towards human progress, others indicate an increasingly perilous outlook for the planet

2050 Scenarios, Four plausible futures is intended to develop a vocabulary and framework to help us envision different futures and provide a platform to discuss the implications of the implied trajectories. Ultimately they help to identify what is worth striving for and what to avoid.

Arup has developed the scenarios in line with our commitment to shaping a sustainable future and a recognition that the path towards it will be challenging. Radical design solutions will be required. Our approach plots each scenario in relation to two intersecting axes: planetary health and societal condition. The science-based targets of the nine Planetary Boundaries, Arup's Drivers of Change cards, as well as the United Nations' Sustainable Development Goals (UN SDGs) were used to set parameters and guide the scenario development.

The core narrative of each scenario is accompanied by a story told from the perspective of a person within that world. A timeline of events between today and 2050 describes how each world could come to exist, along with key facts and references. The extent to which each scenario satisfies the 17 UN SDGs is also indicated.

SOCIETAL CONDITION DECLINES PLANETARY HEALTH IMPROVES

GREENTOCRACY describes and improvement in planetary health which has been enabled by severe restrictions on human society: restrictive living conditions, conflict and authoritarian regimes prevail. The accompanying story details the everyday compromises made by Moussa as he heads to work in eastern Senegal

EXTINCTION EXPRESS depicts both declining planetary health and societal conditions. It is questionable how much longer humanity can survive. Caitlyn, and Oslo-based commodities trader, is shocked into facing the realities of her privileged existence. **POST ANTHROPOCENE** shows how societal conditions and planetary health might exist in a harmonious relationship, fortifying each other for mutual progress and benefit. Taman, a biotech project manager in Jakarta is finding his place in this balanced world.

SOCIETAL CONDITION

HUMANS INC represents our current trajectory: a world in which societal conditions advance at the cost of planetary health. The accompanying story describes Yuka, a Nunavut native, as she struggles with the changes that have engulfed her once remote home.

PLANETARY HEALTH DECLINES

Plausible future conditions help to challenge existing biases and assumptions about what is possible, engaging curiosity and imagination. Building and sharing scenarios allow the co-creation of visions of a future worth working towards.

Introduction

Most global trends indicate an improvement in societal wellbeing; an increase in global life expectancy, GDP and education levels. Simultaneously, other trends depict a more perilous future, particularly regarding our environment: global temperature and sea level rise, an increase in extreme weather events, ocean acidification and tropical forest loss. These trends are often viewed individually and perhaps perceived as being unrelated, yet they interact in complex and often intricate ways.

This document provides a view into of four plausible futures that explore the intersection of planetary health and societal conditions in the year 2050. These were developed in collaboration with Arup colleagues from around the world with backgrounds ranging from geotechnics and urban planning to structural engineering and ecology. The scenarios are neither predictions nor forecasts, but summaries of future worlds.

Our research began with a review of global trends and projections obtained from think tanks, governments, statistical data, NGOs and research institutions. While some trends are presented as inevitable – life expectancy is increasing, the world is expanding its urban footprint, global population is on the rise – other trends, such as frequency of extreme weather events, food security, and income disparity are highly uncertain and subject to variability.

The trends were mapped into a four-square matrix with two axes: planetary health and societal condition. Planetary health measures the condition of Earth's natural systems, including water cycles, forests, oceans, biodiversity and climate change. Societal condition describes the state of humanity, and encompasses factors such as the quality of life, public health, societal structure, governance systems, education, and work.

This matrix was then populated with twenty critical factors that will affect our global future, each with multiple possible trajectories. A working group considered, confirmed and clustered the trajectories along the two axes, setting the baseline for the four scenarios.

The first iteration was the result of a two-day working session. A cross-section of leaders and experts was then brought together to explore and expand these scenarios and to consider the role that the UN SDGs might play. The scenarios were further developed into this set of four narratives, stories, data and timelines.

We hope the scenarios spark your imagination and help you think about the role that all of us can play in designing, building, inhabiting and living in our communal future.

In the interest of space, only one of the scenarios is described in full in this extract (published with permission). The full document, describing all four scenarios in detail, can be obtained by contacting the futures foundation office.

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POST ANTHROPOCENE

Both people and planet are on the path to a regenerative world. Society consumes resources at the rate at which they can be replenished, populations are diverse, and societal structures are balanced.

Humanity is well on its way towards a shared consciousness and an understanding of Earth's limited resources – that production and consumption are intrinsically linked to the natural environment. There is no 'away' to throw discarded things. Global ecosystem services are recognised and valued, helping to improve the quality of both planet and society. Circular processing measures are in place and most nations abide by them. Full life-cycle and ecological resource assessments are mandatory for all new products. Global biodiversity loss has halted, and protected areas are seeing ecosystem recovery. Everyone has, and knows, their carbon quota and daily spend; Al provides daily updates, and state governments penalise overspend.

The multi-stakeholder vision for an equitable and thriving future has prevailed. All global leaders are proud to wear the 'thriving planet = thriving people' symbol showing their support for the drive towards the post-Anthropocene epoch. Cities around the world have transitioned from being in conflict with nature to something approaching symbiosis.

Science Based Targets (SBTs) for resource use and emissions are well established and are key to today's recovering planet. The 2020s saw technology companies hotly contending for the position of 'green leader' driven by competing aspirations in 'green tech' and philanthropy.

Cross-fertilising innovations in sensing and AI have led to major breakthroughs in planetary health monitoring. Big tech-players had varying motives for participation in the race for a better planet: some saw their position of power as an opportunity to do good, while others saw an opportunity to capitalise on shifting consumer priorities; both paths have led to a brighter present.

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Literacy rates have risen dramatically since the 2020s, with nearly 60% of the global population now completing a high school education. Global change and interdisciplinary environmentalism have a strong presence in the curriculum of school systems around the world. The 'green economy' employs a large portion of the population, with public-private partnerships supporting 'planet first' initiatives.

Life-Long Learning Accounts for almost every citizen have been set up as part of the global carbon taxation scheme introduced in 2030. These fullyfunded upskilling opportunities ensure that the working population is equipped to continue driving innovation and regenerative advancements. Workers are paid a living wage and can pursue jobs that they enjoy and are meaningful. As open borders are expanded and knowledge is willingly shared, individuals have increasing freedom to move around the world. This global pursuit of knowledge and opportunity, unhindered by the geo-political conflicts of the past, is supporting a new era of technological innovation and cultural exploration.

North America experienced the worst widespread mono-culture crop failure with the two-pronged impact of drought and pathogen outbreaks due to the vector change from climate warming in 2025. The Great Climate March of 2028 was held in response to food and biofuel price hikes. Although devastating, these events heightened the global debate on how to sustainably feed the growing population and ultimately catalysed action. Advances in agriculture have been developed: both GMOs that require little water, zero pesticides and less land, as well as innovative deep dynamic organic farming. Some praise GMOs and engineered farming for their efforts in eliminating famine events, while others argue that only organic agriculture truly respects the planet. Both approaches have improved biodiversity and soil quality where practiced.

The famines of 2025 and 2026 also affected far more than just diet. It unleashed an interest in personal carbon accounting similar to the 2010s' fascination with daily health and behaviour monitoring which later evolved into predictive medicine. As a result, the cost of carbon is now included in the price of goods and transactions. The 'we-conomy' has also grown, with shared assets now preferred as they enable better utilisation of personal carbon quotas. The resulting shift in industrial practices, transport and consumption patterns has further de-coupled GDP growth from resource consumption.

What was once known as rubbish or garbage is one of today's most valuable resources and is mined both on land and sea. Multinational negotiations for repurposing waste for energy, fashion, manufacturing and fertiliser started in the 2020s. This was the precursor for the 2032 Glocal Garbage Protocol (GGP) which agreed that all countries will use 50% reused materials in all new production and would repurpose 90% of their new waste. Everything is considered a resource. The GGP cleaned up 95% of the Great Pacific Garbage Patch by 2040, but the microplastics will remain a challenge for some years to come. Artefacts of the era, such as plastic bags, bottles and rubber ducks, were collected and are now on display at The Plastic Patch Museum in Calcutta.

It is acknowledged that progress towards a global consensus and a balanced planet has been hard fought, yet the rewards won by working together from a stable climate to the miracle of precision medicine – are spurring even greater collaboration.

The Parliament of the Commons was established as an arm of the United Nations (UN) General Assembly bringing voices of the global commons, like our Oceans, Forests, Savannahs and Atmosphere, to the world stage for the first time; each has their own flag flying at the UN. Talks about giving AI a voice started in the 2040s and proved controversial. A healthy debate is ongoing.











clean enerqv

stable weather

POST ANTHROPOCENE

Timeline

2021 LARGE-SCALE CLIMATE CHANGE CONSEQUENCES

5% of Arctic sea ice has melted (since 1980, Australian bush fires increased by 60% (from 2017 levels), and a Polar bear sighting was recorded in Denmark the first time ever

2028 GREAT CLIMATE MARCH

Inspired by food and biofuel price hikes that followed drought and widespread crop failure across the USA

2037 INDONESIA GOES CIRCULAR

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Indonesia is the first country to execute fully circular processing on their waste and refuse. 50% of global resources are ethically and economically sustainable, coming from mining yesterday's garbage dumps. This was a result of the Global Garbage Protocol in Bogatá. Global migration has since decreased for the first time in 15 years as domestic markets thrive

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2023 GLOBAL CLIMATE ACTION FUND ESTABLISHED The Climate Action Fund is

established in Europe and China as global courts agree to hear its first Climate Inaction Class-Action Law Suit. The SBT coalition forms to formalise metrics for all corporations and governments

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2033 BLACK MARKET SAND AT AN ALL-TIME HIGH

Global sand reserves are a fraction of total demand and black-market trading has tripled, driving the industry to re-think its processes. Leading global concrete manufacturers commitment to 100% renewable energy for all production by 2040, helping Earth reach 1.5:1 consumption rate

2041 BUILDING GUIDELINES FOLLOW SCIENCE BASED TARGETS (SBTS) SBTs are the norm for building codes and urban

design guidelines in both new and retrofit design based on the SBT materials assessment metric. The C40 Cities group has evolved into the C400

2045 VIRGIN PLASTIC BANNED GLOBALLY Circular processing of waste

is now the global norm and all plastic is made from 100% reused materials

2049 COMMONS WELCOMES NEW MEMBER

The Savannah flag flies at the UN and the global commons have a voice on the world stage thanks to the efforts of the Parliament of the Commons

2042 FIRST NORTHERN WHITE RHINO IS REWILDED

Tiestering

BBC news reports that near extinct species of both flora and fauna have been recovering (white rhinos in Africa), as scientists report that global biodiversity loss has stabilised. This is one success story from of the UN Parliament of the Commons, the catalyst for land-use preservation practices

2047 PLASTIC PATCH MUSEUM OPENS

The Plastic Patch Museum opens in Calcutta where the artefacts of the Anthropocene are displayed for posterity

2050 EARTH OVERSHOOT DAY AVOIDED

Earth reaches 1:1 consumption rate resulting from the various measures put in place, from the birth-rate decreasing for the 15th year straight, to every baby born receiving a personal carbon quota and assigned an accounting device

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Book Review

by Charles Brass – Chair, futures foundation

For the first time in seven decades we live in a world without global leadership.

Every Nation for Itself: Winners and Losers in a G-Zero World by Ian Bremmer



here are two reasons for wanting to review this book. First, the theme is something likely to be of interest to anyone with a serious interest in the future. Second. the author resists the temptation to simply describe his preferred outcomes and instead utilizes a tool familiar to all futurists - alternative possible scenarios to sum up his thesis.

The book was originally written in 2012 (although the paperback edition reviewed here appeared a year later with a new introduction by the author) and hence has no mention of such critical contemporary political

issues as Donald Trump and Brexit. However, it clearly anticipates the possible emergence of both these phenomena, another potential reason for reading it.

This is the opening paragraph of the preface: "in June 2012, United Nations Secretary-General Ban Ki-moon opened the United Nations Conference on Sustainable Development, also known as the Rio+20 summit, with a warning: This gathering is too big to fail. But for President Barack Obama, British Prime Minister David Cameron and German Chancellor Angela Merkel, the event was apparently too big to attend."

Bremner's argument is that these world leaders recognized that forums such as this one had little likelihood of solving pressing global problems, so they were best avoided. It was better not to be there than to be publicly associated with failure. This is a major theme of the book, that many nations, or more accurately, their national leaders are either unwilling or unable to demonstrate any leadership, at a time when leadership could hardly be more crucial.

As he says in his introduction: "for the first time in seven decades we live in a world without global leadership. In the United States, endless partisan combat and mounting federal debt have stoked fears that America's best days are done. Across the Atlantic, a debt crisis cripples confidence in Europe, its institutions, and its future. In Japan, recovery from a devastating earthquake, tsunami and nuclear meltdown has proven far easier than ending more than two decades of political and economic malaise. A generation ago, these were the



or to drive a global agenda. world's powerhouses. With Canada, they made up the G7, the group of free-market democracies that powered the global economy. Today, they struggle just to find their footing" (p3).

As part of discussing whether this is a temporary or permanent situation, Bremmer (who is president of a major global political risk research and consulting firm) explores and debunks the idea that one or more of these countries might again rise to prominent power, or that one of the so-called 'emerging powers' (such as India or China) might take on the mantle of global leadership.

However, Bremmer supports the theory that nature abhors a vacuum, and hence devotes much of the book to exploring the consequences of what he calls G-Zero (which he defines as: "a world order in which no single country or durable alliance of counties can meet the challenge of global leadership" (p1).

Having explained in Chapter 1 how G-Zero evolved, in Chapter 2 Bremmer devotes 30 pages to how the world arrived at this point (another feature of the book that would endear him to foresight practitioners, who always take time to understand how the past brought us to the present, before venturing into the future).

Chapter 3 then explores the consequences of G-Zero. He notes: "established powers no longer have the political and economic muscle to impose and enforce rules or to drive a global agenda. Equally crippling, the development needs of emerging powers will lead their governments to reject calls for the sorts of collective international action that demand sacrifice" (p69). He focuses in this chapter on "the most likely arenas of state-to-state conflict, the fight over global standards, and the implications for the most basic of all necessities – air, food and water" (p69).

He concludes the chapter saying: "G-Zero crises echo and exacerbate one another. A lack of global leadership makes it all but impossible to build consensus on what to do about climate change, droughts, floods, and the food price shocks they trigger. State efforts to manage the fallout breed protectionism, which slows growth and poisons international relationships, and gives governments new incentives to hoard information and control communications. This generates more public anger, more turmoil and more G-Zero) (p107).

Chapter 4 looks in great detail at which countries (and international institutions) might be expected to gain (and lose) from G-Zero. There is much too much detail in this chapter to give an accurate summary here, but anyone interested in the possible trajectories for international affairs would usefully read these 50 pages.

In Chapter 5, entitled "what comes next" Bremmer begins to look at possible future trajectories. Following his analysis in the previous chapter, Bremmer concludes that the future is impossible to predict. He concludes that the two key variables that will determine the future are, first, the extent of collaboration between the US and China; and, second, the relative strength (or cohesiveness) of other major countries.

Thus, he ends up with a 2x2 matrix, embracing four possible future scenarios which are named in the diagram below which is reproduced from page 157.



In just over 30 pages, Bremmer explores each of these four scenarios in detail, focusing on situations that might make one scenario more or less likely. Readers will need to see for themselves what Bremmer concludes.

He finishes the chapter with what he calls a –wild-card scenario – G-Sub Zero – in which the world fragments even further and the number of 'countries' explodes. He does conclude that this is the -, least likely of his five scenarios, buy posits that the longer G-Zero lasts the more likely this scenario becomes.

Given the dominance of America during the twentieth century it is probably not surprising that Bremmer devotes his last chapter to looking specifically at the consequences for that country of G-Zero. As in his chapter on Winners and Losers, Bremmer concludes that these consequences will depend on the sorts of actions taken by Americans and their leaders in coming years. He ends by saying: "Washington must accept the limits of U.S. leadership in a G-Zero world. Americans must turn their backs on commitments that can't be sustained and rebuild the nation's strength from within....If farsighted U.S. policy makers can use this period of transition to deepen traditional alliances, those based on both shared values and shared interests, and seek out new partners and allies, they will have taken a crucial step toward making America indispensable for the world that comes next" (p195).

Book reviews most often focus on recently released works. This is one occasion on which this reviewer reckons it is worth reading (or rereading) a 7-year-old book.

Americans must turn their backs on commitments that can't be sustained and rebuild the nation's strength from within.

by Morris Miselowski





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BY 2040'ISH































by Terri Briseno

uturists can dish out some exciting and downright scary visions for the future of machines and science that either enhance or replace activities and products near and dear to us.

Being beamed from one location to another by teleportation was supposed to be right around the corner/ in our lifetime/just decades away, but it hasn't become possible yet. Inventions like the VCR that were once high tech – and now aren't – proved challenging for some: The VCR became obsolete before many of us learned how to program one. And who knew that working with atoms and molecules would become the future of technology? The futurists, of course.

Forecasting the future of technology is for dreamers who hope to innovate better tools – and for the mainstream people who hope to benefit from the new and improved. Many inventions are born in the lab and never make it into the consumer market, while others evolve beyond the pace of putting good regulations on their use.

Next, we'll take a look at some sound-loving atoms, tiny tools for molecules, huge bunches of data and some disgruntled bands of people who may want to set all of this innovation back with the stroke of a keyboard.



Computer brains (or chips) have diminished in size – some powered by just five atoms, and one-atom developments about 10 to 20 years down the road.

LUCIDIO STUDIO INC./GETTY IMAGES

ZERO-SIZE INTELLIGENCE

No one wants to be called a zero in terms of intelligence, but having zero-sized intelligence in computing means packing a whole lot of brains in a tiny, tiny package. Computer companies encourage forward-thinking creativity, and some, such as Intel, even have futurists on board to predict where technology is headed. Futurist Brian David Johnson sees the future advance of computing to so small a size that the housing for the computer itself is almost zero. We have the technology to put computers almost anywhere and in almost anything. Computers used to take up entire rooms, then whole desktops, laps and palms, to micro-chip-sized casings and atom-powered transistors invisible to the naked eye

Many have predicted that the shrinking of computing size would also lead to the end of something called Moore's Law. Gordon E. Moore, a co-founder of Intel, famously predicted that every two years the number of transistors on a chip will roughly double every 24 months. As computer brains have diminished in size – with some models powered by just five atoms and one-atom developments about 10 to 20 years down the road – getting smaller may reach an end point as atomic transistors replace chips. Whether the low cost will trickle down despite the high cost of innovating such small transistors remains to be seen

MOON, MARS, MORE?

Space exploration has taken some hits in the 21st century, with cuts to the U.S. and other international space program budgets. But with the Curiosity Rover on Mars as of August 2012 and plans to launch the "most powerful rocket in history," the Space Launch System (SLS) by 2017, NASA is still very much in the business of the future. After the

planned, unmanned sendoff of the SLS in 2017, NASA intends to send a crew of up to four astronauts into space by 2021. This could be a return to the moon, with capabilities for missions on other planets

Even with the world economic downturns of this century, individuals and corporations in the private sector also plan to keep aiming for the stars and enabling people to buy space exploration tickets of their own. Some futurists of decades past would be surprised to see that space travel for every man isn't commonplace, but for a few wealthy adventurers, it's no longer the stuff of science fiction. Maybe their trips will help drive down costs for the rest of us.

GOING UP?

Instead of choosing a floor when getting on an elevator, imagine choosing a planet. Many futurists support the development of a Space Elevator for transporting people from the Earth to the Moon and to Mars. Such a planetary lift is probably at least four or five decades away, but the vision is very much alive now as innovators talk of a 62,137-mile (100,000-kilometer) ribbon that can be firmly attached to our home planet and extended to an anchor station in outer space. We will simply ascend on a high-tech thread into the deep beyond and hope not to get stuck between floors

NEUROHACKING

Will there be a day when you say "I can't read your mind, you know!" and the reply will be "Oh, stop it – of course you can!"? It could happen. Neuroscientists are finding ways to read people's minds with machines, and although this has been in the works for decades, real progress is being made by researchers at the University of California, Berkeley, and elsewhere. Translating electrical activity from the brain by means of decoding brainwaves is one way to help sufferers of dementia, for example, who have complications with neurotransmitters relaying thoughts into comprehensible speech or holding thoughts long enough to get them out verbally before they're forgotten.

On the other hand, it is more than a little frightening to know that science and machines could soon have access to our innermost thoughts. Implications for neurohacking into people's thoughts have also been studied in relation to neuromarketing, which targets people's brains by manipulating their wants and desires through marketing and advertising. Our thoughts and actions could actually be hijacked by a form of media that makes us think we're getting what we want, when really, we're going for something our brains may only think is supposed to be good

MASS DATA

Even if scientists and marketers can't get access to our brains for neurohacking or neuromarketing, can they get access to our data? With unprecedented amounts of images and data available online, filling clouds and other Web-based storage, media, government regulatory bodies and marketers work around the clock to mine user preferences, habits and even relationships.

What to do with all of this data, and more specifically and maybe more urgently, how can we keep all of our activities in the virtual space from shaping the real space of our world? As search preferences narrow results when using the Internet, and our reading and research have become "optimized" based on what key words people search for, our choices in buying products and accessing news and information narrows as the enormous stores of data accumulate.

Data and the machines and algorithms used to manage and make sense of it could largely replace independent decision-making – either large or small – and it is happening at such a speed that it's sometimes hard to remember the data isn't in control. People still control the data, but just who has this control and what they do with it will become an ongoing challenge

QUANTUM CONTROL

Picture a tiny bit of a thing on an already miniscule computer chip. Something microscopic with the power to think like a computer without the need of complex circuitry and capable of being moved by light or sound: That is quantum technology simplified.

Put less simply, quantum control uses a technology derived from physics for computer applications. Quantum electrodynamics, or QED, describes the interaction of matter and light, and QED-circuits take this interaction to the computer chip by trying to harness the interaction for circuitry in machines. Phonons are sound-activated quantum vibrations that move circuitry and motor machines at the chip level.

All of these breakthroughs in quantum technology are advancing the zero-sized intelligence we touched on earlier, and they're very exciting to techies and scientists alike. They merge science and technology into something that isn't mere experimentation, but has enormous implications because they work and may someday power the computer and communication devices we use every day. Their enormity comes in their tiny, atomic-sized power.

YOUTH TECH MOVEMENTS

Young people have never before been so technologically savvy and interconnected, with so much time on their hands and so little money in their pockets, as they are now. There have always been disgruntled youth who fight the establishment and their parents for change and strike out against the old regimes in favor of new freedoms. But in the 21st century, a global recession, lack of opportunity and lack of hope for the youth are practically boiling over – or, at least, are simmering and ready to explode.

People between the ages of 16 and 24, and ranging from the unschooled to those with doctorate-level educations, are coming up in a world where they may be stuck at home and without job prospects for years. All of this discontent may breed organized anarchy or rebellion in the form of technological or infrastructure sabotage, either physically or in cyberspace.



In what's been called the Arab Spring, anti-government protesters in Cairo, Egypt, used social media and networking to help organize protesters in Tahrir Square in 2011.

CHRIS HONDROS/GETTY IMAGES

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NANOTECHOLOGY, NANOMED

Technology at the nano level, or nanotechnology, allows for unbelievable precision and a way to copy the work of nature at its most basic functioning, but just how small is a nano? According to the National Nanotechnology Initiative, a sheet of paper is 100,000 nanometers thick and there are 25.4 million nanos in 1 inch. A nanometer is one-billionth of a meter!

How is this impacting technology and the future? In just about every field, nanotechnology is being used for innovations in engineering, medical devices, imaging, computing and many more. Nanomedicine is one area experiencing rapid and dramatic growth. Because many illnesses and disorders in the body take place at the cellular level and grow as ruled by the formation of genetic makeup, nanotechnology has the capability to treat at the very root of the condition, rather than after it's fully spread throughout the body. It can be both preventative and curative because treatment reaches the narrowest and most minuscule centers of control. Neurosurgery and gene therapy are just two areas within nanomed that are particularly well-suited for nanotools and technology.

NANOFACTORIES

Taking nanotechology from an idea to reality means being able to make some very, very fine and small-scaled tools. Nanotools have to be assembled at the molecular level in order to be tiny enough to perform work at the nano level, and often, the work of nanotechology is so specialized that the tools need to be modeled and made specifically for each job. Handling the tools involves careful and minute planning, as well, because of their delicate balance and scale. In generations to come, those skilled in molecular nanotechology will be in high demand in the workforce.

DARK NETWORKS

As the world gets smaller by sharing more and more of the same cyberspace and social tools, we are, like it or not, becoming a bigger collective target for the bad guys. While our data puts us all "out there" in many ways, that same data enables those involved in dark networks and activities to get lost and take on false, covert identities in order to plan bigger and bigger attacks.

Anonymous is one such dark group involved in "hactivism," having found its way into sensitive stores of information from the likes of the FBI, Visa and Mastercard, and government Web sites from the U.K. to China, causing large-scale, disabling computer terror. It functions as a collective of many individuals and spreads its login and computer activities thin enough to lead authorities in too many directions to track, and its acts target everything from politics to commerce.

As incidents of cyber-attacks – and even infrastructure attacks to water systems and electrical grids – grow, billions of dollars are stolen and billions of people are at risk each year. This may lead to increased cyber-insecurity, or widespread fear of the very technology people need to go about everyday commerce and communication



Members of Anonymous (seen here wearing Guy Fawkes masks) hacked the French presidential Elysee Palace Web site in early 2012, and briefly knocked the FBI and Justice Department Web sites offline in retaliation for the U.S. shutdown of file-sharing site Megaupload.

PHOTO COURTESY VINCENT DIAMANTE



UNIVERSAL TRANSLATORS

As the Old Testament Bible story goes, the people once spoke the same language and were proud of the accomplishments they made in society, so they decided to build a tall monument to their accomplishments to spread their name to the heavens. God decided to humble their pride by confusing their language so they no longer spoke the same tongue. He created a babble and they abandoned their tower of Babel and scattered out to other nations, no longer proud and no longer one.

Maybe the creators of universal translators aren't out to reunite the nations and put an end to global language confusion, but amazingly enough, the day is near when two people speaking different languages can communicate with one another in their own voices but in languages they don't know or understand. An Arabic speaker can push a button and have his words translated into English as spoken, and vice-versa

Anyone who uses Internet-based translators knows the difficulty of getting an accurate translation through a computer, but some of the biggest names in computer technology and military intelligence are hard at work in enabling easier communication across the nations

AVATARS, SURROGATES, ROBOTICS

Maybe you aren't comfortable with all of the futurist predictions and even the current rate of technological advance, and that's OK. You can be yourself and interact in the world in a fairly low-tech way while allowing a surrogate, avatar or robot to live your online and tech life for you. Even the U.S. Defense Advanced Research Projects Agency (DARPA) has budgeted millions of dollars to create avatars that will act as surrogates for real, live soldiers.

While avatars and surrogates were once the stuff of games, virtual reality and computer interfacing, they are taking on more and more active roles as replacements for living breathing humans. Or, are they enhancements for humans?

Fully-realized robotic machines have become more and more widespread in medical technology and scientific development, both in the lab and in hospitals, enabling those with paralysis to move limbs, for instance. "Living" life with 'second life' surrogates is likely to become more and more common every day for those of us in less specialized fields, too.

The original article appeared here - <u>https://electronics.howstuffworks.</u> <u>com/future-tech/10-futurist-predictions-in-the-world-of-technology.htm</u> and is reproduced with permission



While avatars (like this one from the game Second Life) and surrogates were once just the stuff of games, virtual reality and computer interfacing, now they're taking on more active roles as replacements for living, breathing humans.

TINA STALLARD/GETTY IMAGES

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