



FUTURE PROOF YOURSELF
— TOMORROW'S JOBS —

Executive Summary

Explore the world of work in 2025 in a revealing evidence-based report by future consultants The Future Laboratory and Microsoft, which identifies and investigates ten exciting, inspiring and astounding jobs for the graduates of tomorrow – but that don't exist yet.

Introduction

Tomorrow's university graduates will be taking a journey into the professional unknown guided by a single, mind-blowing statistic: 65% of today's students will be doing jobs that don't even exist yet.

Technological change, economic turbulence and societal transformation are disrupting old career certainties and it is increasingly difficult to judge which degrees and qualifications will be a passport to a well-paid and fulfilling job in the decades ahead.

A new wave of automation, with the advent of true artificial intelligence, robots and driverless cars, threatens the future of traditional jobs, from truck drivers to lawyers and bankers.

But, by 2025, this same technological revolution will open up inspiring and exciting new career opportunities in sectors that are only in their infancy today.

The trick for graduates is to start to develop the necessary skills today in order to ensure they future proof their careers.

This report by future consultants The Future Laboratory attempts to show them how to do just that in a research collaboration with Microsoft, whose Surface technology deploys the precision and versatility of pen and touch to power creative industries ranging from graphic design and photography to architecture and engineering.

In this study, we use extensive desk research and in-depth interviews with technologists, academics, industry commentators and analysts to unveil 10 new creative job categories that will be recruiting tomorrow's university students.

These future jobs demonstrate a whole new world of potential applications for the technology of today, as we design astonishing virtual habitats and cure deadly diseases from the comfort of our own sofas. It is a world that will need a new approach to training and career planning.

Welcome to tomorrow's jobs...



JOB 01

VIRTUAL HABITAT DESIGNER

Overview

By 2025, virtual reality will be the digital space where tens of millions of us will spend hours each day, working, playing and learning.

Entire worlds will exist for us to explore online, each of them so immersive, interactive and realistic that they will be almost indistinguishable from the real thing.

This virtual reality future can already be seen taking shape today. More than 12 million virtual reality headsets will be sold in 2017, according to market researchers CCS Insight. And, by 2020, the total global market for VR technology will be worth \$40bn, according to research by SuperData.

Over the next decade, an entirely new global industry will grow up to create, support and manage the existence of the new virtual domains that will become a part of our everyday lives. As Kevin Kelly, founder of Wired, says, 'VR will be the next dominant platform after smartphones.'

An explosion of completely new job opportunities will happen in the wake of VR's rise to world domination, and the hunt will begin for the smart young graduates with the right combination of qualifications, talents and personality to fill them.

Already, studies by IQiyi.com show that at least 200 VR start-ups in China alone are recruiting the best talent in the field. Job search website Indeed.com reports that adverts asking for VR skills have jumped by 800% since 2014.

Universities and colleges are noting a rise in demand for VR-related skills and beginning to offer courses to train future generations of graduates as the technology matures and begins to reshape job markets across the world.

Deakin University in Australia has collaborated with VR and augmented reality software developer EON Reality to offer the world's first graduate diploma of virtual and augmented reality, starting in September 2016.

Digital Media Institute at Intertech, Louisiana, is offering two intensive courses incorporating 3D modelling, texturing, animation and motion capturing and digital compositing to prepare students for future VR jobs in architecture, the oil, gas and rail industries, law enforcement and the military.

As Jerome Ternynck, CEO of SmartRecruiters, says, 'VR is going mainstream and we're seeing it move from gaming into consumer electronics and software applications, and out into the wider economy.'

'There will be whole new categories of job opportunities available across many sectors for those who have the skills and mindset to take advantage of them.'

Job Description

By 2025, virtual habitat design will offer some of the most exciting and creative career prospects in a global industry that will be producing millions of new jobs.

'These designers will be the superstar pioneers of the industry, leaving behind game design and joining product teams to create exciting new entertainment, work and learning environments,' says Dave Miller, recruiter at Artefact.

VR Habitat Designers will need to possess the storytelling skills of an online game designer and editor together with the spatial design expertise of an architect or town planner to be able to imagine and create entire virtual worlds.

Training in cognitive psychology and behavioural science will be useful too, as teams of designers seek to understand exactly how humans interact with their surroundings through touch, smell and sight in order to persuade our mind to accept a virtual environment as a reality.

'These new jobs will require an interesting mix of architecture and psychology to allow them to understand precisely how to make sitting under a virtual tree as satisfying as sitting under a real one,' says Jon Brouchoud, owner and founder of VR tool and application development company, Arch Virtual.

A typical day at work could involve anything from building a hyper-realistic virtual office complex where colleagues from around the world can meet and work together to creating a virtual replica of a Premiership football stadium where gamers can 'be' their favourite player, or reconstructing a World Heritage site, such as Machu Picchu, in cyberspace to cut down visitor numbers to the fragile real destination.

Sarosh Mulla, architect at Paterson Architecture Collective, believes it will spell the end of the commute to work for hundreds of millions of people. 'Instead we'll see 'telecommuting' where workers will 'travel' to a VR office space from the comfort of their own home,' she says.

'In schools and universities, VR will enhance the learning experience, allowing architecture students to visit buildings and history students to meet and converse with figures

from the past. No more sleeping through lectures!'

VR Habitat Designers will have the opportunity to use their skills in compassionate ways too, nostalgically recreating days gone by for sick and dying patients or for elderly people with dementia.

'There have already been cases where VR has been used to recreate a treasured garden or room for people who are terminally ill,' says Brouchoud of Arch Virtual.

'In the near future, we'll refine these approaches to reduce pain and suffering for the ill and elderly by recreating past memories to help them escape from a difficult present.'

By the mid 2020s, the most skilled and imaginative VR Habitat Designers will be in huge demand for their ability to make long-cherished human fantasies, such as flying like a bird or meeting aliens on another world, come virtually true.

'We will create virtual worlds where the normal rules of gravity don't apply or where faster-than-light travel to other planets is possible, and we will need people with formal training in fields such as architecture to execute it,' says Brouchoud.

'But to make these fantastical environments feel realistic and comfortable will require designers who understand the basic principles of form, space and order, as well as hierarchy and proportion and scale.'

Entire generations of future architects and designers will work entirely in virtual environments. 'Whole professions will grow up around designing VR buildings and environments for use in VR alone, with no intention of creating them in the real world,' says Brouchoud.

'By then, VR will be so realistic that it's nearly indistinguishable from the real world. People will be able to touch and even smell their virtual surroundings. At that point, there will be no limit to the worlds that these designers can create and experience.'



JOB 02

ETHICAL TECHNOLOGY ADVOCATE

Overview

Over the next decade, the long-awaited era of the robots will dawn. Robotic personal assistants, manual labour technicians and customer service representatives will start to become a part of everyday life as emerging artificial intelligence technologies become ever more sophisticated.

The global robotics market will blossom to \$153bn over the next five years – \$83bn for robots, and \$70bn for artificial intelligence-based systems – according to research by Bank of America Merrill Lynch.

Autonomous robots will account for almost a quarter (22.8%) of the annual growth in automation every year until 2024, dominating the smart machine market, according to BCC Research.

For mankind, it will be a second industrial revolution, releasing millions of workers from tedious administrative roles to follow more creative career paths. But it will also bring us face-to-face with some of our darkest fears about the rise of the machines, popularised in sci-fi chillers such as *The Matrix* and *The Terminator*.

The emergence of non-human intelligence will undoubtedly create many new jobs. The demand for robotics engineers is projected to grow by as much as 13% over the next two years, according to the US Bureau of Labor Statistics.

There will be an extra 55,790 new jobs in the field of robotic engineering by 2018, an annual increase of 5% each year, research by Recruiter.com reveals.

But at the same time, many manual, middle management and even professional jobs will be under threat from the robotic newcomers. Machines that can understand natural language and communicate in everyday speech will automate 60% of all labour time, and 66% of work in finance and insurance, say researchers at consultants McKinsey & Co.

As we struggle to come to terms with the radical changes wrought on our society by the intelligent machines in our midst, new categories of job will emerge to ease relations between the robots and mankind.

People with robotic technology skills sets will obviously be in demand. Worcester Polytechnic Institute in the US has just become the first college in the country to offer an accredited robotics engineering undergraduate degree to begin to supply tomorrow's robot creators.

But equally sought after will be skilled and imaginative creatives who can help business and governments to decide what robots should – and shouldn't – be allowed to do, and educators who can teach the machines how to talk to humans without frightening or confusing them.

In Germany alone, €200m of state funds has been earmarked for research into the management of future human-to-machine interactions. Programmes like this will be aiming to produce a new breed of human-to-robot communicator in a world where, by 2018, three million workers will have a 'robo-boss', according to Gartner Research.

Manoj Saxena, a venture capitalist in cognitive computing and big data analytics, says, 'This powerful technology needs people who can convince the general population that it is for the betterment of society.'

'Without their ability to discuss AI ethics and moral responsibilities, the robotic revolution may falter in the face of fears around both real and perceived threats from an AI apocalypse.'

Job Description

Ethical Technology Advocates will be mankind's go-betweens with a wave of robots and artificial intelligence applications that will be helping to run our complex and connected world by 2025.

One of their key jobs will be to negotiate our delicate relationship with the robots by setting the moral and ethical rules under which the machines – and their makers – operate and exist.

Their role will be crucial in ensuring that none of our nightmares about robot world domination ever come true. As Satya Nadella, CEO of Microsoft, says, 'The most critical next step in our pursuit of AI is to agree on an ethical and empathic framework for its design.'

This will be one of our most pressing concerns as the robot revolution unfolds, says roboticist and artist Alexander Reben – who has invented the first robot that can choose whether or not to inflict pain on a human.

'I've proved that a harmful robot can exist,' he says. 'So we will need people who can confront our fears about AI getting out of control.'

Other Ethical Technology Advocates will work as teachers to robots, showing their machine students how to understand the subtle nuances of everyday speech and behaviour that will allow them to interact reliably – and safely – with their human colleagues and bosses.

As Fernando Pereira, distinguished researcher in natural language understanding at Google, says, 'There are so many ambiguities in the way humans speak and act that require a human level of common sense, and years of instruction from our families and friends, to understand.'

'An AI will be completely lost in dealing with all these subtleties unless it has a human teacher to give it a very rich and varied ability to solve problems.'

It will be these human teachers that allow robots to care for us safely. Robot nurses will need to understand our grandfather's sarcastic sense of humour to treat him appropriately, according to Apparently Apparel's blog Best

Jobs of the Future.

Ashleigh Rhea Gonzales, researcher in NLP innovations and software process improvement at Volumes Research, believes a creative arts education will give these workers the critical thinking and decision-making skills necessary to shape commercial and government policy around the introduction of AI and robots.

'Technical skills such as coding are useful, but having enough business sense to create AI and robot products with a client's best interests and needs in mind will be vital,' she says.

An Ethical Technology Advocate's communication skills will be crucial in deciding whether the robot revolution succeeds or fails. It will be their job to convince a sceptical population that the march of the machines is in their best interest even as whole middle-management and semi-skilled work categories are destroyed by automation.

'If the public opinion is that the developers behind this technology are reckless, we're never going to see fully autonomous systems on the market,' says Gonzales.

'Without strong communicators managing development, marketing and damage control when something goes wrong, the robots will essentially fade from popularity.'



JOB 03

DIGITAL CULTURAL COMMENTATOR

Overview

A picture paints a thousand words, the old saying goes, summing up the way in which tomorrow's Generation Z population will choose to talk to each other.

Increasingly, visually based social media networks such as Instagram and Pinterest are replacing written word rivals such as Twitter and Facebook among younger audiences.

In 2016, Instagram will grow by 15.1%, compared with just 3.1% for the social network sector as a whole, and will add 26.9 million users over the next four years, almost double that of Twitter, according to eMarketer.

By 2025, visual will dominate social media communications, and workers who can master this shared language of imagery will be much sought-after as communicators to mass audiences by businesses and art institutions.

Museum and galleries will want their help to reach out to mass audiences through the stars of the next generation of social media, while brands will treasure their ability to use their background in art and culture to help them build new and relevant public images in cyberspace.

It's already clear that a plethora of new job opportunities will be created over the next decade in the field of visual cultural communications. By 2018, there will be a surge in demand for multimedia artists, animators, and illustrators – especially those with computer technology skills – as companies seek to talk to their customers in online and digital formats, according to the National Endowment for the Arts.

In 2016, 68% of galleries were strongly interested in learning more about how social media and online marketing can be used to engage and attract both new and existing customers, according to the UK Contemporary Gallery Report.

Acting to plug an expected skills gap, universities and

colleges are already moving to offer training in this emerging global industry. In 2015, Penn State Behrend in the US introduced a new major in digital media, arts and technology.

The programme combines traditional liberal arts study with the technical skills needed to work across digital media. Students can choose to study any two of four fields: digital humanities, including library and archive work; storytelling through film, video and gaming; simulation and human-computer interaction; and data visualization and assessment."

Sharon Dale, associate professor of art history and chair of the DIGIT programme, says, 'Students combine digital skills such as animation, music production, text-encoding, object-based programming and GIS mapping with virtually any subject that interests them from history and psychology to game development.

'They will leave us with advanced technical skills and the ability to think, write and collaborate creatively.'

Job Description

In the 2020s, Digital Cultural Commentator will be the secret weapon that both brands and centres of high culture will use to cut through the cacophony of online white noise to talk effectively to tomorrow's audience.

Masters of the next generation of visual social media, they will be able to bridge the gap between the arts and a digitally savvy public by using simple, impactful images to communicate complex and challenging ideas.

Their skills with emerging technologies such as virtual and augmented reality will allow them to build relationships with Generation Z audiences in whole new worlds and spaces.

Stephanie Storey, author, art history major and TV/news producer says, 'Future art history students will have the visual vocabulary to tell compelling stories with a single image.'

'They will have an instinctual grasp of successor social networks to Snapchat and Instagram that will allow them to build online visual campaigns that go viral and connect with huge audiences.'

In the arts, their role will be central to discovering new crowd-sourced revenue streams as more public arts institutes become privatised and need to generate income from supporters and visitors.

'In the future, these big public national collections could be majority private businesses. So they need to convert the engaged visitor into a spending customer in order to survive and thrive financially,' says Jo Marsh, director and consultant at cultural brand strategy and communications agency, Jane Wentworth Associates.

Frances Morris, director of Tate Modern, believes skilled workers such as digital culture commentators will be key to enabling art institutes such as her own to attract visitor

spending power and guarantee future commercial success.

'They are the ones that will allow audiences to have a playful encounter with a museum and art gallery that doesn't make them feel stupid, so suddenly they feel it's a place for them,' she says.

'Once you've attracted them in that way, you can transition to a deeper, more scholarly engagement as they grow older and more experienced.'

Training in art history, curation and cultural studies will develop core skills that allow Digital Cultural Commentators to understand and communicate the context in which the arts exists.

But an education in business studies, writing, marketing and PR skills, combined with a grounding in social media youth cultures, will give graduates an edge over purely academic rivals.

'Future workers in this world will need a background in a subject like art history to have a deeper understanding of why the arts are relevant to everyone,' says Marsh, of Jane Wentworth Associates.

'But as we see more and more younger audiences moving from 140 characters of Twitter to Snapchat, we'll need people who understand spontaneity and very fast interactions and can communicate serious subjects to mass audiences on those terms.'

'The level of visual communication is incredibly exciting, people feel like they can express a mood and a point-of-view just through imagery. People who can do that will be incredibly valuable to us.'

One of their most important jobs will be to identify and communicate with social media influencers, such as YouTube stars with multi-million-strong audiences, to

supply them with images they will want to share around the world.

'There's a new generation of curators emerging who completely understand that it's not enough to speak in an academic way,' says Marsh.

'They know that they have to use visual languages across social media to reach as many people as possible.'

However, it won't be just the arts that are seeking future graduates with a strong combination of cultural training and visual social media savvy. Brands too will want to employ Digital Cultural Commentators to build new identities.

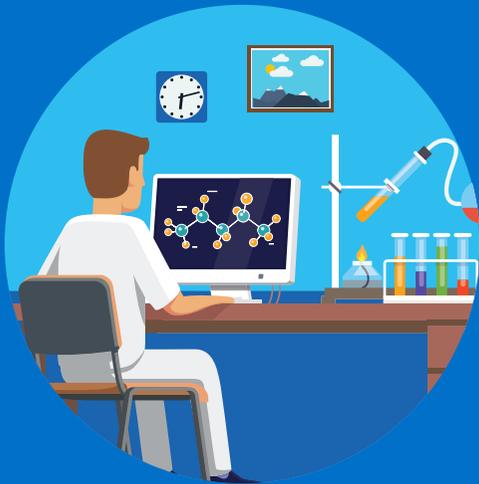
Stephanie Dieckvoss, arts management consultant and stage 1 leader on BA culture, criticism and curation at CSM, says, 'It seems to me that there is a lack of awareness by companies that are not trained in analysing imagery about the history and implications of visual language.'

'I can see that art historians and people who are trained to use images to tap into our shared cultural history could actually help brands shape their visual identity in the future.'

Her own programme combines curatorial training with writing skills and an awareness of digital images and networks. 'Our students are very good with social media too, and often have some knowledge of web design training,' she says.

'These are people who know how to sell complicated ideas in the new social mediums. Some of them move into advertising and branding agencies or design studios.'

'They are interested in helping the very different worlds of culture and tech to interact, and discover new opportunities in the process.'



JOB 04

FREELANCE BIOHACKER

Overview

For over a century since the days of the Victorian amateur gentleman innovators, science has been a closed shop, dominated by professional teams working in university and corporate research and development departments.

Now the rise of the internet and an explosion of open-source software platforms has democratised the sector, allowing citizen scientists to log onto sites such as Zooniverse to do everything from discovering new planets to building new molecules.

And this is only the beginning. Businesses are waking up to the potential power of crowd-sourcing as solutions to complex medical and technological challenges and are encouraging amateur scientists to get involved in finding new vaccines or sequencing DNA.

In the US, Genspace Biohacking Lab has launched as the first non-profit community lab in the country, providing space, equipment and software to allow freelance bioscientists to explore projects that corporate research has rejected as unprofitable or too speculative.

An open-source gene-editing tool called CRISPR is allowing thousands of scientists around the world to collaborate on searching for treatments for depression, schizophrenia, autism and Alzheimer's.

'It was this approach, rather than Big Science, that gave us the gene-editing tool CRISPR/Cas-9, which is going to be the breakthrough of the decade,' says Hank Campbell, president of the American Council on Science and Health.

Synthetic biology start-up Bento Bio has created the Bento Lab, the first mobile DNA laboratory. Funded by a successful Kickstarter campaign, the product went on sale in 2016 with a mission to revolutionise citizen science by allowing anyone to experiment with DNA.

Co-founder of Bento Lab, Bethan Wolfenden, says the lab

is being used by field scientists to diagnose deadly diseases such as Ebola and Zika, track wildlife poachers through their DNA, and study the evolution of crickets in the Alps.

It is also being used by hobbyist scientists to explore their own DNA or test new foods and craft beers, by foragers analysing mushrooms, and farmers testing animals.

The US government has recognised the opportunity for innovation and scientific breakthroughs represented by millions of hobbyists investigating their pet obsessions, and it introduced the Crowdsourcing and Citizen Science Act of 2015 to encourage the use of citizen science within the federal government.

At the same time, educators are beginning to teach the next generation of graduates and students how to make a living out of citizen science. Biohack Academy, an education programme at the Waag Society Amsterdam, is an open-source course available at labs all over the world.

Danielle Wilde, associate professor of design research at the University of Southern Denmark, Kolding, says, 'It will teach students to grow their own fuel, food, filaments, pharmaceuticals, fragrances, and fungi by learning how to design, grow and extract your own biomaterials.'

By 2025, citizen science will have evolved from home hobby status into a global sector that provides freelance careers for millions of graduates with solid bioscience backgrounds and an inquisitive and entrepreneurial attitude to work.

Job Description

Freelance Biohackers will be at the cutting edge of tomorrow's most exciting bioscience projects, playing a key role in projects ranging from the search for the next generation of antibiotics to the creation of genetically modified creatures.

'The basic procedures for targeted gene manipulation are getting simpler and more accessible to almost anyone,' says Hank Greely, director of Stanford University's Center for Law and the Biosciences.

'It isn't hard to imagine a future where we'll fix everything from eye problems to liver disorders to muscular dystrophy with targeted genetic tweaks.

'I'm willing to bet that within 20 years, some biohacker will create a unicorn. He'll take genes from an animal that grows horns, insert it into a horse and a billionaire's 12-year-old daughter will get a unicorn for her birthday.'

Working from home, or from the growing number of freelance work hubs, freelance biohackers will work on open-source software platforms with hundreds, even thousands, of others in hive-like teams.

University research departments and major drug and bioscience companies will use them to piece together complex DNA-based answers to some of the big questions of the next decade, from treatments for cancers in ageing populations to vaccines for new epidemics fuelled by our globalised culture and accelerating climate change.

As Hank Campbell of the American Council on Science and Health says, 'These mavericks and freelancers are the future of applied biology because large drug companies often won't tackle problems that they fear won't generate a large enough profit.'

Dr Darren Nesbeth, a synthetic biologist at UCL, predicts that biohackers will fuel major scientific breakthroughs

because, unlike professionals in academic institutes, they can spend their time brainstorming and indulging in creative, blue-sky thinking rather than teaching and writing papers.

Creating mythical creatures for billionaire patrons may be one approach for biohackers who seek to make a living from home with a laptop and a state-of-the-art software system, but their DIY DNA skills will be put to more noble uses too.

Feng Zhang, co-creator of gene editing innovator CRISPR, believes that biohackers will help to save – or even bring back from extinction – species of wild and domestic animals as an expanding global human population puts pressure on biodiversity through habitat destruction.

An understanding of scientific and medical methodology, combined with training in advanced data analytics, will be core skills for graduates who dream of a career as a biohacker in the decade ahead.

The ability to work naturally, non-competitively and collaboratively with large virtual teams that you will never meet in person will be a key personal characteristic too, alongside patience, an eye for detail and a talent for making intuitive, leftfield leaps of the imagination.

But in a field that is likely to remain lightly regulated to encourage innovative thinking and unusual approaches, people from outside traditional science and medical disciplines will have the freedom to play a leading freelance role in major projects.

As Todd Kuiken, an environmental scientist, says, 'Leading bio-scientists increasingly feel that they don't need a PhD to be a scientist.'

'They believe that any sharp, scientifically inclined mind can contribute to the body of science – and that the more minds

that are dedicated to solving the world's scientific problems, the faster we'll solve them.'

Kuiken is certain that the growing citizen biohacking community will set its own codes of conduct to address worries about the ethics and morality of their work.

'Professional scientists tend to only think about the ethical implications of their work after their research has been completed,' he says.

'The DIY bio community started organising early on to establish its own safety and ethical principles because it is naturally collaborative and in constant conversation about what it's doing, and why.'

Many people already working in the early versions of the biohacking field believe that future biohackers will hold the best hope of game-shifting science and technology breakthroughs because they are not tied down by the bureaucracy of mainstream research.

Josiah Zayner, scientist, biohacker, and founder of biotech company The Odin, says, 'Corporate and academic researchers have to fill in a million forms, wasting a tonne of money and time in the process.'

'This holds back really radical research, and people are dying and suffering because of all these rules and committees.'

'In the future, people like me are going to say: 'We're going to do it anyway and start curing people because we know that we can.'

'Give people access to these tools and technology and we'll let them loose to change the world.'



JOB 05

IOT DATA CREATIVE

Overview

By 2025, our homes and businesses will be enmeshed in the Internet of Things, a complex web of billions of digitally connected devices, ranging from washing machines and refrigerators to smart entertainment systems and energy control centres, all constantly talking to each other and us.

A measure of how all-encompassing the IoT will become can be seen in the steep growth in sales of connected devices. The global market for IoT technology will grow from \$1.9 trillion in 2013 to \$7.1 trillion in 2020, according to IDC Research.

These devices will restock food supplies, monitor our health and sleeping patterns, manage our day-to-day work and leisure plans, and automatically call for help if they detect a fault.

But they will also present us – and their makers – with a major headache: how to make sense of the deluge of real time data they are constantly producing in a way that will allow us to improve both our lives and future versions of the devices themselves.

It's a challenge that will give birth to a whole new global industry of analysts and experts which can already be seen emerging today. Demand for IoT systems software developers rose by 215% in 2016 and information security analysts by 113%, according to Wanted Analytics research.

Big data analytics and the Internet of Things (IoT) will create 182,000 new jobs in the UK and add £322bn to the economy by 2020, research from the Centre for Economics and Business Research reveals.

But behind the skilled technologists who will run the infrastructure of the IoT, there will be another army of workers dedicated to sifting through the data to find the stories that it is trying to tell us all.

'As IoT and the proliferation of big data continues to

rise, we're seeing strong demand for data scientists and back-end engineers who can collect, organise, analyse and architect these disparate sources of data,' says Ryan Johnson, categories director for global freelance marketplace Upwork.

The worldwide hunt to find and train the people who will surf tomorrow's tsunami of data has already begun. In early 2016, MIT ran a 6-week course called Internet of Things: Roadmap to a Connected World.

It was aimed at 'individuals who want to leverage the Internet of Things to address business challenges including cybersecurity, system architecture, and data management.'

By 2025, universities and colleges will be teaching undergraduates how to turn the raw data from the Internet of Things into compelling narratives that help to make us better people living better lives, and make the world as a whole a better place.

Job Description

Internet of Things Data Creatives will be central to the future development of the vast web of connected devices that will soon form a protective net around the health, home and work life and entertainment of billions of people.

It will be their job to sift through the waves of data being generated each day by devices in our clothes, our homes, our cars and our offices and find meaningful and useful ways to tell us what all that information is saying.

They will need to have three key talents: a finely honed ability to recognise patterns, a skill at asking sharp and difficult questions, and a natural flair for storytelling.

Pattern recognition will be vital for spotting what is – and what isn't – important in what the devices are telling each other, and us. The noise of data will be deafening and so there will be a need for a new role in filtering and interpreting this data, says a report titled *People-Centred Design for the Internet of Things*.

Internet of Things Data Creatives will be trained to notice patterns in the data that indicate something that we should know about our health, the way that we drive our car, or the energy use of our households.

Then they will use their storytelling skills to design an eye-catching and easily digestible way to communicate the information to us, either online or through future generations of virtual and augmented reality tools.

'These creatives will be our translators, turning data into 3D and VR infographics and images that teach us, over months and years, how to look after our health better, to run our homes more enjoyably and cost-effectively, or drive our cars more safely,' says Tom Savigar, partner at The Future Laboratory.

Data Creatives will also have a major part to play in helping technology brands and businesses to develop new and

improved versions of existing IoT systems. They will be the gatekeepers of what works and what doesn't – culturally, technologically and emotionally – in tomorrow's hyper-connected world.

Data Creatives will analyse the streams of feedback, from both devices and customers, to create visual aids that help to constantly super-charge functionality and inform new waves of technological innovation.

As Andrew Caley Chetty, partner at Thingful, a global search engine for the Internet of Things, says, 'In five to 10 years, these people will be making actionable decisions about the way that different areas of data link and collaborate.

'Their expertise will show businesses how to keep improving and upgrading IoT networks and products to ensure that they address real customer needs.'

Creative and critical thinking will be central to the data creative's role of ensuring that connected consumer products are valuable both to businesses and their customers.

A knowledge of engineering, technology, sensors and communications will be helpful too for graduates hoping to enter this fascinating and challenging new area of work.

Caley Chetty says, 'Deep specialists can create solutions around the hardware and software technologies.

'But for thinking and visioning about how best IoT products and services can connect people and brands you need creative thinkers, and people with arts and culture skills and backgrounds will increasingly provide those vital insights.

'You need those people, with different experiences and different skillsets, to be able to problem-solve and find value, which is the most important thing within a business.'

However, perhaps the most vital talent of all for these future workers will be a spirit of entrepreneurial daring. The best – and most sought-after – members of this profession will be the ones who are constantly asking hard questions about how to disrupt the Internet of Things in order to make it better.

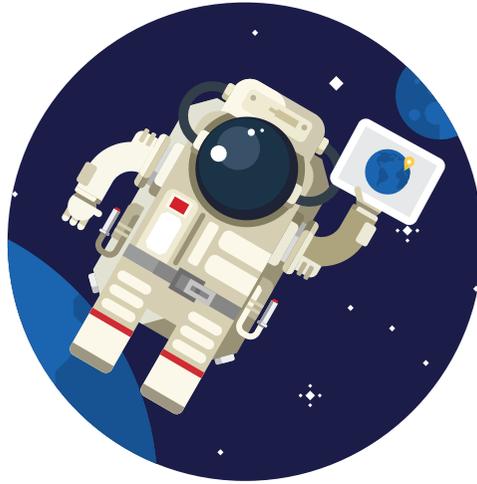
As digital news outlet Quartz says, 'In the field of consumer IoT, the greatest benefits usually come from people doing the challenging intellectual and strategic work to find the kind of issue-based questions that could unearth potentially world-changing solutions.'

FIVE JOBS FOR 2025 AND BEYOND

Virtual Habitat Designers and Freelance Biohackers could be mainstream career choices for future graduates in 2025, considered no more remarkable than videographers and radiologists today.

But extensive desk research and in-depth expert interviews revealed the first intimations of other, even more exotic, job opportunities that could be attracting people with the right talent and skillsets in the years beyond 2025.

While it's too early for us to describe them in the same depth and detail as our first five jobs, we are able to give graduates a glimpse of the shape of these other careers to come...

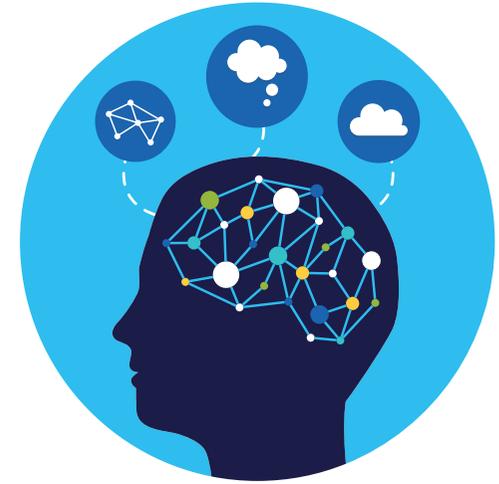


Space Tour Guide

Earth orbit will become the new frontier for intrepid travellers by the mid-2020s and whole new categories of jobs will grow up to make their journeys into space discovery safe and enjoyable.

Space Tour Guides will use their exhaustive knowledge of the location of the thousands of satellites and pieces of junk from previous space missions to construct visits to the most interesting places in orbit.

They will have a secondary role in finding and plotting the location of forgotten abandoned spacecraft and defunct equipment to create a log of the orbiting memorabilia of mankind's first half century outside of Earth's atmosphere.



Personal Content Creator

By the late 2020s, software-brain interfaces, pioneered by teams of neuroscientists, will have started to enter the mainstream, allowing mass audiences to read and capture thoughts, memories and dreams.

Personal Content Creators will help people to use these systems to increase the storage capacity of their over-stretched minds, providing services that allow them to dip in and out of treasured memories and experiences at will.

They will also be responsible for curating the memories and experiences of people who have recently died so that their families have what is effectively a showreel of their lives.



Rewilding Strategist

Natural ecosystems will be stretched to their limits by 2025 as our world tries to cope with nine billion humans living in resource-hungry mega-cities. Traditional conservation strategies will no longer be enough.

Rewilding Strategists will stitch together viable ecosystems in stressed landscapes, using patchworks of flora and fauna from all over the world, rather than worrying about only using indigenous species.

They will reintroduce plants and animals that have been extinct in a region for centuries – wolves and beavers could make a come back in Britain – and manage assisted migrations in order to create resilient and vibrant landscapes in the face of advancing climate change.

A further role will be to rewild the remnants of our industrial past, turning abandoned steel towns, coal mines and factories into forests filled with animals and plants rather than preserving them as sterile heritage sites.



Sustainable Power Innovator

By the mid-2020s, climate change and resource depletion will have made the shift to a post-carbon economy humanity's most pressing goal. One of the main barriers to a completely sustainable energy infrastructure will be the struggle to store power for the days when the wind doesn't blow or the sun doesn't shine.

Sustainable Power Innovator – workers with expertise in chemistry and material science alongside finely honed entrepreneurial instincts – will scour the periodic table, combining elements and organic materials to invent new battery storage capabilities, for both on and off-grid use. They will also oversee the introduction of superfast charging facilities to cope with the power demands of our ever-growing reliance on the Internet of Things in a hyper-urbanised world.



Human Body Designer

Over the next two decades, bio-engineering advances will extend the average healthy human lifespan to more than 100 years as the growth of replacement tissues and organs becomes everyday and affordable.

Human Body Designers will combine design skills with bio-engineering know-how to create a huge range of customised human limbs, either to perfectly match the existing skin tone, musculature and colour of the rest of a person's body, to provide exotic new looks or enhanced functionality for particular jobs or sports. Pop-up body shops will become part of every virtual and bricks-and-mortar high street.

Please visit <https://aka.ms/futureproof> for more info



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