The new jobs for the 21st century

Lawyer Denise Nurse has more than 200 clients, yet has never set foot inside a solicitor's office. Welcome to the 21st-century world of work

Tim Bouquet

(Mark Harrison)
Denise Nurse

It's 2030 and, as you approach your supermarket till, there is not a cashier to be seen. In this cashless world, personal service in shops, banks and cinemas has become a thing of the past, replaced by scanners and a robotic personal assistant that not only organises your life, but also empathises with you as your mood dictates. Thanks to biomedical engineering, you can buy spare skin, joints and heart valves that never wear out. With your Oyster Card, you can fly the world. And Sydney is just two hours away by space-plane.

Far-fetched? Not a bit of it. The Robotic Life Group at Massachusetts Institute of Technology (MIT) has already built "biologically inspired" Kismet, whose skills set includes being able to communicate with speech and respond emotionally with a range of convincing facial expressions. And last October, the Institute of Medical and Biological Engineering at the University of Leeds began work on a £50 million, five-year programme to develop spare body parts for Britain's ageing population.

Although these industries sound futuristic, they are becoming increasingly commonplace. As our lives change radically over the next 20 years, so will the job market. That is why the Department of Business, Innovation and Skills will this month unveil a list of 20 future professions in a paper entitled The Shape of Jobs to Come, as part of its Science: So What? So Everything campaign.

Rohit Talwar, creator and CEO of Fast Future, the research company that compiled the list, believes that in two decades, most jobs as we know them now will not exist. As the challenges we face become more complex, he says, the education system will have to change, "to train people for multidisciplinary roles that, say, require a mixture of biology, kinetics, material science, physics and information technology".

Although many of these jobs do not exist yet, and although Britain doesn't feature as highly in the World Economic Forum's Global Competitiveness rankings as it once did, we are far from being out of the picture. Some of these careers do already exist – and they are being pioneered by Brits.

The virtual lawyer

Why traipse off to a swanky Georgian office to be charged £500 an hour for legal advice when you can have a virtual lawyer online or come to your office for half the price? When Denise Nurse, a commercial solicitor specialising in the entertainment business, met

employment lawyer Janvi Patel, they realised that a team of virtual lawyers would be able to charge just for their advice, without adding on the cost of office rents and expenses.

In 2007, their practice, Halebury, opened its virtual doors for business, offering the services of eight freelance solicitors. The company now has more than 200 clients, ranging from huge multinationals to small start-ups.

The clients – who include Sky, Nike and Olympic yachtsman Ben Ainslie – don't miss out on face-to-face time. "Because we don't waste hours commuting to an office, we have more quality time to travel to clients when they need it," says 33-year-old Nurse.

As more law firms operate globally, crossing legal jurisdictions and time zones, Nurse sees increasing opportunities. "We are exploring tie-ups with virtual lawyers in Los Angeles and already have links in the Middle East."

She also has another career: presenting the weather on Sky News and BBC Two's Escape to the Country. This began when she was working as an in-house lawyer at BSkyB and won a competition to find new presenters. "I am first and foremost a virtual lawyer," she says. "In the future, though, increasing numbers of people will have a portfolio of careers, but no office."

"When I was at school, I won a prize, a book called Exploring Space. I still have it, so this really is a dream come true," says Virgin Galactic test pilot Dave Mackay, who, in a couple of years, will be flying fare-paying passengers into space 68 miles above the Earth.

Last December, Virgin Galactic unveiled its first commercial spaceship, VSS Enterprise, which will, in 2011, make its first foray into space from Spaceport America, a high-tech, Foster-designed terminal under construction in the Mojave desert in New Mexico.

Some 300 passengers have already bought tickets – at £120,000 a time – or put down deposits, and another 82,000 registered on the Galactic website. Wannabe travellers are said to include William Shatner, Sigourney Weaver and Professor Stephen Hawking.

So far, so elitist, but there are spin-offs for starstruck jobseekers. The aim of the £240 million project is to have six spaceships and, says Mackay, "We should be interviewing for space pilots in around three years." Then there are likely to be openings for space tour guides, and yet more jobs if Sir Richard also builds a launch station in Scotland.

In the early years, spaceship pilots will fly passengers up and then straight back down, but Mackay estimates that, in the next 20 years, "It should be possible to get from A to B very quickly. The thought of going from London to Sydney in a couple of hours is fantastic. Until recently I was flying the route with an Airbus A340, a journey of around 23 hours."

The body-part maker

"Some patients, especially soldiers, love the more robotic look," explains Stuart Mead. "But others like their device to blend anatomically with the rest of their bodies, which is why we not only employ clinicians, engineers, software programmers and technicians, but also artists who match the skin tone to that of the wearer."

Mead is chief executive of Touch Bionics, based in Livingston, Scotland, maker of the world's first bionic hand, the i-LIMB, which was launched commercially in 2007 after a decade of development. Some 800 are now being used in 40 countries.

Uniquely, the digits each have fully articulated joints that move independently, powered by five tiny motors and sensors triggered by nerve signals. They can grip anything from mugs to steering wheels.

Last month, Mead launched ProDigits, the first bionic finger. "We estimate that the partial-hand amputee population is around 52,000 in the European Union and 1.2 million worldwide," he says. "Until now, these people have had no commercially available powered prosthetic solution open to them."

Bionic body parts don't come cheap. To buy and fit an i-LIMB hand, with aftercare, costs about £30,000; the ProDigit, because it is custom-built, is around £40,000. But, says Mead, "In five to ten years, I think we shall reduce the cost significantly. Already, a few hands have been fitted free by the NHS."

Mead is now producing 500 hands a year and has more than 90 employees in Scotland and the US. Body-part makers, he predicts, are going to be in even greater demand as more of us live longer and more original limbs wear out. He blanches at the concept of a bionic person, though, "I see us developing our R&D into upper-body technology over the next three or four years, to the point where we are able to replace the whole of somebody's arm, and then maybe parts of the leg. Then there are bionic hands that can feel; these things are very possible."

What should wannabe body-part makers have on their CV? Good technical skills and proof of dealing with challenges, says Mead. "You are not just coming to work for a robotics company. We are in the business of transforming lives and empowering people."

The vertical farmer

On Kevin Frediani's "farm", there is no soil, no smell and no noisy tractors. The only sound is that made by more than 11,000 plants on the move. Lettuces, spinach, chicory, chard and herbs, growing hydroponically in trays mounted in ranks three metres high on 70 computer-controlled hanging rigs, are travelling sedately around Frediani's glasshouse, taking on fresh nutrients at a feeding station.

In September 2009, the 42-year-old became Europe's first vertical farmer when he began his project at Paignton Zoo Environmental Park. His pioneering system, called VertiCrop, devised by Valcent Products in Cornwall, was voted one of the 50 Best Inventions of 2009 by *Time* magazine.

"We don't use pesticides, there is no pollution and we don't have to worry about the weather," says Frediani. The system produces three times the crop you would get farming flat: "On just 100sq m, I can grow £100,000 worth of crops." Yet it uses only about five per cent of the water consumed in traditional agriculture, and it is all recycled.

Currently, the only mouths benefiting from his plants are those belonging to the animals at the zoo (one hippo can munch through 100lb of vegetation a day; the system is saving £18,000 on the annual lettuce bill alone). But on a planet where water and arable land are in increasingly short supply and there will be two billion more mouths to feed by 2050, Frediani believes the implications of high-yielding vertical farming are immense.

"Vertical agriculture will really come into its own in towns and cities," he says. "Schools, hospitals and housing estates could have their own vertifarms, tended by a new generation of vertical farmers.

"Think of the energy savings Tesco could make by growing more food next to its supermarkets," he adds. Local jobs would also be generated, and local people trained to use robotic harvesting tools.

Already, plans are afoot to grow vegetables in such urban spaces as New York. Dickson D. Despommier, Professor of Public Health at Columbia University, for instance, is trying to raise £12 million to build a 33-storey food farm in New York that could feed 50,000 people.

"In 20 years, sustainable urban vertical farms will be commonplace," says Frediani.

The alternative-vehicle developer

If Hugo Spowers has his way, not only will we be waving goodbye to vehicles driven by internal combustion engines, but also vast automobile production lines. His vision?

To build hydrogen cars in small, bespoke factories that create jobs in local communities.

The 49-year-old, Oxford-educated engineer spent 15 years designing, building and driving racing cars, but then "squaring my environmental conscience with motor sport became more and more difficult". Which is why he founded Riversimple, which unveiled its first carbon-fibre hydrogen car in London in June 2009. Powered by a tiny 6kW fuel cell and weighing just 350kg, the two-seater, designed for local travel, can reach 50mph, has a range of 240 miles, a fuel consumption equivalent to 300mpg and greenhouse gas emissions less than a quarter of the most efficient petrol-engined cars.

But what is really radical about Spowers is that he will be the first car manufacturer

who will not sell any cars. Instead, he will lease them for around £200 a month and then 15p per mile, with Riversimple responsible for servicing, provision of fuel and maintenance. "This is all about longevity and low running costs. At the end of its 20-year life, our car will be recycled to make new models."

In full production, Spowers' factory will employ around 200 workers. However, all designs and specifications will also be available online, so that, in return for a licence fee, other engineers can build them and incorporate their own refinements. "This not only improves the design," says Spowers, "it also means people can open their own manufacturing plants. Because these cars have fewer components than today's models, they are simpler to build. Vehicle engineers of the future will not be selling models; they will be selling mobility."

But will we ever see Jeremy Clarkson in a hydrogen car? "Even the most hardened attitudes can change," Spowers insists. "Look at the increasing numbers who think that SUVs are irresponsible."

Fifteen more jobs of the future

Nanomedic

Will devise a range of subatomic "nanoscale" healthcare devices, procedures and body inserts, including "cargo ships" that seek out cancerous cells in the bloodstream.

Genetically engineered crop/livestock farmers

Will raise high-yielding genetic crops and livestock. Current projects include trying to induce cows, sheep and goats to produce therapeutic milk.

Old-age wellness manager/consultant

Will offer medical, pharmaceutical, psychiatric, natural and fitness solutions to the elderly.

Memory-augmentation surgeon

Will add extra memory capacity to people who want to increase their recall ability, and help those suffering sensory shutdown.

New-science ethicist

Will help society make consistent choices about not just whether we can make developments, but whether we should.

Climate-change-reversal specialist

Will advise on possible climate-change solutions, from filling the oceans with iron filings to giant sun-ray-deflecting umbrellas.

Quarantine enforcer

The person to guard the gates – to cities, and countries – should a deadly virus break out.

Weather-modification police

Will control and monitor who is allowed to shoot rockets containing silver iodine into the air, to provoke rainfall from passing clouds.

Avatar manager and devotees

Avatars (computer personas that serve as personal interactive guides) could be used to support or even replace teachers in the elementary classroom. The devotee is the human who ensures that the avatar and the student are properly matched and engaged

Narrowcasters

Specialists working with content providers and advertisers to create personalised content.

Waste-data handler

Will provide a secure data-disposal service for those who do not want to be tracked.

Virtual-clutter organiser

Will help to organise electronic lives, handling e-mail, storing data and managing IDs and rationalising applications used.

Time broker and trader

There are already 100 time banks in the UK, trading depositors' time instead of

money. A broker will buy and sell surplus time from banks to help those who need it.

Social-networking counsellor

Will help those traumatised or marginalised by social networking.

Personal branders

Will help to "brand" personalities, working as an extension of the role played by stylists, publicists and executive coaches.

Did your parents choose your degree course?

A new survey suggests that many students don't choose what they study at university. The research, by students at the University of Westminster, found that one in four London university students were "forced" into their course by parental pressure.

It's an interesting finding, especially in the current world of higher education. With fees to pay, other high educational costs and the generally uncertain economic situation, many parents are taking a very hands-on approach to their children's education, and possibly encouraging more vocational choices. There have also been reports of "pushy" parents getting very involved when it comes to UCAS forms as well as more students living at home.

The survey, of 350 London students, all of whom were under 25, and studying full-time, found that 26 percent had argued with their parents about their choice of degree. Almost half were told to "make the choice that their family thought best for them", and 85 percent of these were dissatisfied. One student told the researchers that she had wanted to study English literature, but was told by her parents to study law, as otherwise they would not support her financially.

"I wish I was stronger and had gone ahead with my choice," she said. "I am now so unhappy as law is so difficult and something I am just not interested in."

NUS Vice President for Higher Education, Aaron Porter, said, was not impressed by the research. "Its time for helicopter parents to take flight and students to take charge of their own futures," he said.

But is Porter right, especially in this day and age? Should students stand up for themselves? It makes sense to listen to their parents' suggestions, but I'm not sure it's really worth studying something you don't want to, in order to make someone else happy.