

Breaking into tech

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The great tech disruption

The technology sector is not only growing rapidly itself, but also transforming the way business is conducted. **Lucy Jolin** reports on why there's never been a better time to enter the sector

Discovering cleaner forms of energy, finding new ways to beat hackers, designing the next generation of video games: a career in tech is full of possibilities. Technology is fast-moving, endlessly innovative, financially rewarding - and you don't even necessarily have to be "technical" to make your mark.

"We are employing in just about every segment across our business - everything from marketers to product developers, as well as technical roles," says Alan Laing, managing director UK and Ireland at Sage, a British software company that employs about 13,000 people worldwide.

"I've never seen a better time to get into tech. There's more opportunity and more chance to apply creativity, technical excellence and multiple different skill sets to the opportunities out there than ever before. For example, the tech industry is going to employ more creative people in the next two years than any other industry."

Tech needs new blood: a recent study from the British Chamber of Commerce found that three out of four UK businesses reported a digital skills shortage. This means salaries for the right people are going up. According to the Tech Nation Survey 2017, the average salary in tech is now just over £50,000 - on average, that's 44% higher than non-digital jobs.

What's the best way in? There are multiple routes: a degree and postgraduate study, for example, are essential for some roles. Sam Cooper, 24, is in the final year of his PhD in cancer research at the Institute of Cancer Research, Imperial College London, where his work is funded by Stand Up To Cancer, a joint national fundraising campaign from Cancer Research UK and Channel 4.

"I'm using artificial intelligence (AI) to try and improve the way in which we treat and diagnose cancer," he says. "There's a huge amount of excitement in AI at the moment. Having spent decades playing games, doing cool things with pictures and toying around in simulated worlds, it feels like the field is finding a deeper purpose and tackling several massive challenges facing humanity."

Many companies are also realising the value of apprenticeships. These are available at levels ranging from



The average salary in tech is now 44% higher than in non-digital jobs
Getty

NVQ Level 2 right up to honours degrees and beyond. "The new degree apprenticeships, in particular, are really set to shake up the way we bring people into industry," says Colin Bannister, head of presales, northern EMEA, at global tech company VMware. "You can get a recognised degree without any of the debt and in the intervening period, work and earn a salary."

Daniel Burton, 19, is currently undertaking an apprenticeship at hospitality IT specialist Lolly. He spends three days a week testing products and software at Lolly. The other two days are focused on programming and development.

"The team at Lolly have really encouraged me and put so much trust in my work, which has really helped with my own self confidence," says Burton. "This role has really cemented my thinking that I would like a job in IT. I love the work I am doing, and believe it will really help to support my future within the IT sector."

Go for a career in tech, says Bannister, and you'll find a sector ripe with opportunities for everyone. "This is about transforming businesses, not just about coding," he says. "Every single industry is being either disrupted, enhanced or changed by technology. It's a fabulous time to be entering the sector, as it is so relevant to every industry, bar none."

“Every single industry is either being disrupted, enhanced or changed by tech, bar none”

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Sustainability

The drive for renewables

Emboldened by recent innovations, the renewables sector is booming - and on the lookout for Stem graduates, says **Lucy Jolin**

From Elon Musk agreeing to build the world's biggest lithium ion battery to Volvo's announcement that all their new cars will be hybrid or electric from 2019, clean tech is moving out of the fringes and into the mainstream. In 2015/16, the renewables sector provided about 126,000 jobs.

"This is a great sector to specialise in now, as storage and electric vehicles (EVs) become more popular," says Daniel Brown, external affairs officer at the Renewable Energy Association (REA). "The energy storage and electric vehicle sectors employed an additional 16,000 people in 2015/16. These are set to grow significantly, as EVs become increasingly popular."

Skills are vital in this sector - but so is passion. "Being a clean technology business with a clear focus on sustainable transport, it's important



The renewables sector takes in many skillsets Getty

that our recruits not only have the technical ability, but also have a genuine interest in sustainability; it just doesn't work otherwise," says Fiona Clancy, director of hydrogen car manufacturer Riversimple.

It's a sector that takes in many skillsets, says Brown: electricians and engineers for the solar industry, chemists and data analysts for energy storage, and physicists for bioenergy. That means many degrees could be relevant. Libby Moxon, for example, is about to start the fourth year of her MSci course in physics and astronomy at the University of Birmingham.

She recently completed a nine-week summer placement at Tokamak Energy, a company that is aiming to find new, clean energy sources using the power of nuclear fusion.

"We are very aware of the energy crisis we are now facing and the fact that we do need to be looking for alternative forms of energy," she says. "Fission is an effective form of energy but produces a lot of long-term radioactive waste. Fusion is much less damaging to the environment. It's exciting to know that you are working towards something that is helping the world to be a better place."

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'There is room for more women'

Sadia Maqsood turned her passion for sustainability into a career in engineering

Electrical engineer Sadia Maqsood resolved to put her technical skills to good use after becoming passionate about the damage caused by climate change. Having worked in a variety of roles, she relaunched her career and set out to find a job in sustainable energy.

"I was studying a lot at that time about climate change and I was feeling quite passionate about sustainable energy sources. Then I stumbled on a position at Siemens," she says.

Maqsood started out as a junior manager on wind turbines at Siemens UK five years ago. She is now a senior project manager, working with clients from electricity companies to install turbines across the UK and Ireland.

"Once the contract gets signed, it is my job to bring to fruition everything that has been planned and to implement it. That requires a lot of planning. All the turbines and components are manufactured in our factories and I am responsible for making sure they are produced on time and I also gather a team of people."

One of the biggest logistical challenges is transporting the massive wind turbines, which can be up to 120 metres high with blades spanning 90 metres. These huge structures have to be taken by road from a sea port - many are manufactured in Vietnam - to the wind park, which could be a nine-hour drive.

"It's a big task in itself to physically get the roadworks ready for transport," she says. "It requires us to make a lot of modifications to the roads infrastructure and we need to do a lot of widening of corners."

Maqsood was born and raised in Pakistan and studied electrical engineering at the University of Engineering and

Technology in Lahore. She had dreamed of becoming an engineer since she was five when she decided to follow in her father's footsteps. After graduating, she worked for Norwegian telecoms giant Telenor in Pakistan before emigrating to the UK in 2009 and working as a project manager on the switchover from analog to digital TV.

She says there is room for more women in the wind energy sector, though adds that she has experienced no discrimination.

"You can imagine, in Pakistan, it was quite odd for a woman to be an engineer - there were only a few girls in my class. Then I was really surprised when I came to the UK and again there were only a few girls in engineering. I work with colleagues from other countries like Denmark and Germany and there are a lot more women in project management," she says.

She loves her new career in wind power, especially visits to remote windswept mountains and sweeping hillsides. Fighting climate change and saving the planet take her to some truly beautiful places.

Interview by David Benady



A career in engineering has seen Sadia Maqsood travel extensively in the UK and Europe



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Find your pathway into tech

The range of roles and specialisations in the tech industry is extensive, offering graduates and non-graduates alike the chance to enter into the industry, says **David Benady**

As fears grow of a robot-driven jobs apocalypse in the coming decades, it is reassuring to know that the technology field offers a wealth of lucrative career opportunities even for graduates with non-technical degrees.

Jobs in technology span from the highest skilled roles, such as data scientist, algorithm developer or cybersecurity specialist, to less data-intensive work, such as repairs or support roles in sales and HR.

For graduates, technology careers fall into two broad areas. There are the most advanced technology jobs: coding mobile apps and web pages, creating computer games or writing algorithms to interrogate data, for example.

For these roles, often in specialist agencies or consultancies, candidates need an impressive portfolio of their

“The trick is translating tech issues for people without technical knowledge”

own work, showing off the designs and apps they have created. Meanwhile, those involved in the exciting and futuristic areas of machine learning and artificial intelligence (AI) will probably be very highly qualified, but there are many roles where you don't have to be a technical prodigy to excel.

Graduates can also follow a more traditional route, working in long-established IT and business functions at big organisations. There are opportunities for those with a sharp business brain and an ability to communicate with non-specialists.

“Every company needs a successful technology strategy to support their business and to have one eye on how their world might be disrupted, and try to guess the next big thing,” says Doug Rode, a technology specialist at recruitment consultancy PageGroup.

“A lot of people come into technology support roles and this gives them business knowledge. I know of chief information officers who have worked their way up through business support and business analysis roles,” says Rode.



“Companies need people who understand tech but have a broader business understanding. The trick is translating tech issues for people without technical knowledge,” he says.

A good way to develop these skills is working in a retail environment, for instance at an Apple Genius Bar. Staff in these hi-tech stores sell and service for Apple products and advise consumers on using and repairing them.

Communication and people skills are increasingly in demand in the tech sector
Getty

Behind the scenes, staff are fixing and restoring gadgets. An Apple spokesman says the company employs 14,400 retail staff across Europe including its “highly trained geniuses”. He says the requirements are “an ability to learn and time management”. Across Apple, 37% of new hires globally are women and 54% of new hires in the US are from minority groups, he says.

There are also jobs at other consumer technology retailers, such as Dixons Carphone's technical service arm Team Knowhow. As chief executive of the company's services business Feilim Mackle explains: “We do a very wide range of roles, everything from being on the road delivering and installing our customers' kit, to being on the phone dealing with service enquiries, and roles that require very specific technical skills,” he says.

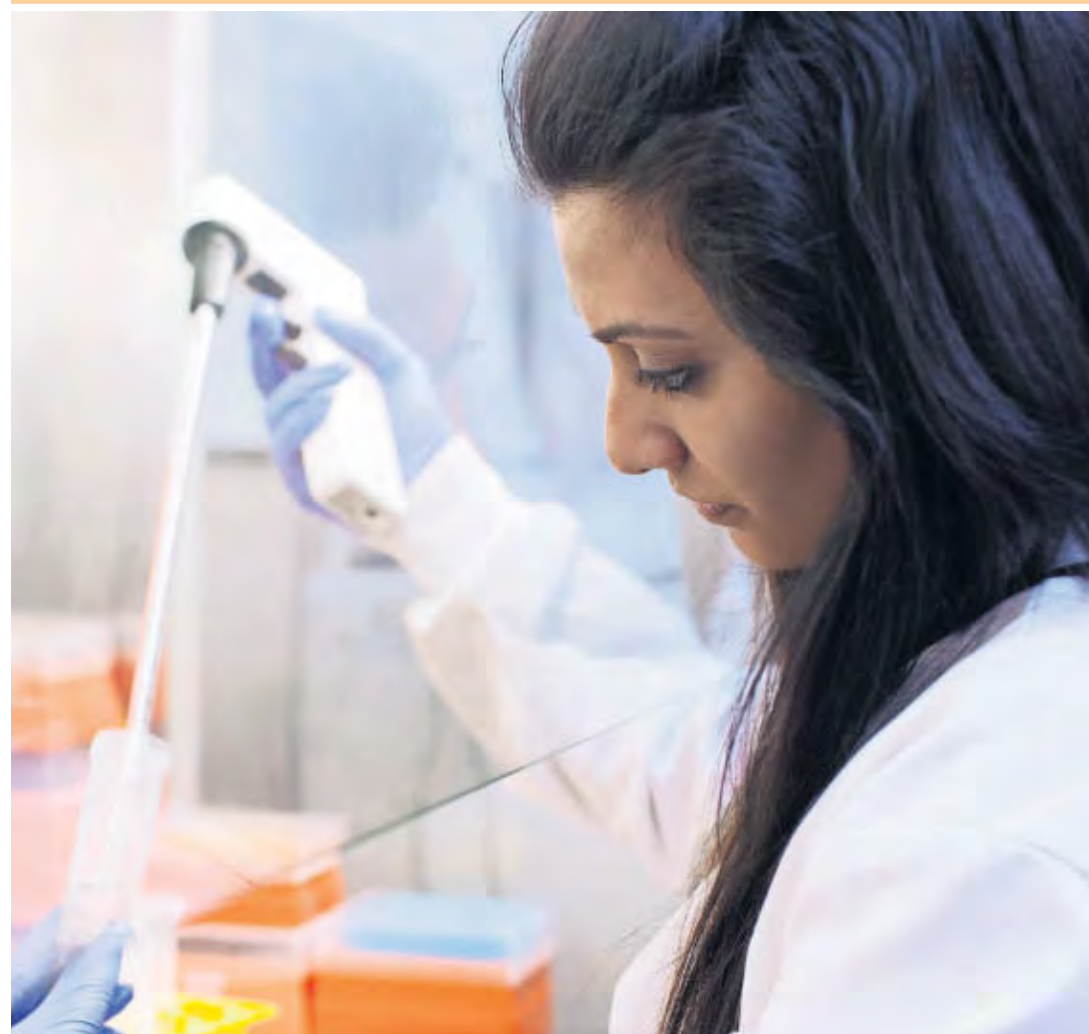
With automation, robotics and AI forecast to affect many areas of the jobs market including white collar roles, graduates may find that a career in technology helps them to stay one step ahead of the robots.

After a tech job? Here's where to look

- The number of tech businesses grew by 28% in 2015, more than twice as fast as the growth in non-digital businesses (up 13%) .
- Most of the UK's tech startup activity is centred in London, where new digital businesses have grown 42% in the past five years. Other fast-growing centres include Belfast, Newcastle, Edinburgh, Birmingham and Glasgow.
- In 2015, the turnover of UK digital tech was estimated at £170bn - an increase of 22% (£30bn) in just five years.

Source: Tech Nation 2017

Women in Stem



Time to break the gender divide

More women are needed in UK tech. So what is being done by universities and employers to recruit them? By **Kim Thomas**

Women now outnumber men at undergraduate level in medicine and the biological sciences. But in the physical sciences, the pattern is different: according to Ucas only 23% of students starting physics degrees in 2016 were women, while for engineering, the figure was 17%. Women also leave science and engineering careers in greater numbers than men: only 8% of working engineers are women.

It matters for two reasons, says Helen Wollaston, chief executive of Wise, a campaign to attract more women into science and engineering. The first is the impact on women themselves:

Stem careers are increasingly being tailored to women to redress the gender gap
Getty

the difference in starting salaries between Stem (science, technology, engineering and mathematics) and non-Stem graduates is about £6,000. The second is the skills crisis: "If we can't get more people in this country with the skills to meet those vacancies, then jobs will go overseas where there are more people with those qualifications."

The main route into a Stem career is still the undergraduate degree, sometimes followed by a master's or PhD. The early specialisation of the English system tends to make it easy for girls to abandon physics at an early age, though the apprenticeship levy on businesses is likely to precipitate an increase in the numbers of Stem

apprenticeships available, while 32 universities and colleges are piloting conversion master's courses in engineering and technology. Some universities, says Wollaston, are adding technical elements to courses such as business studies, as another way of engaging women's interests.

Why are these subjects still so unattractive to women? Cait MacPhee, professor of biological physics at the University of Edinburgh, thinks there is an "element of machismo" in perceptions of physics as a particularly "hard" subject, and that engineering is still regarded as "very hard-hat wearing, tramping around site in steel-capped boots".

Parimala Shivaprasad, a PhD student in chemical engineering at the University of Bath, agrees. Outreach work in schools has made her aware of an "information gap" in the UK: "When we ask children to draw what an

“When we ask children to draw what an engineer looks like, we always have a man with a hard hat”

engineer looks like, we always have a man with a hard hat." It's very different from Shivaprasad's experience in India, where 28% of engineering students are women.

Wise is working to attract more girls in by emphasising the importance of qualities such as creativity, organisational skills and sociability in engineering. It is also emphasising the usefulness of engineering, which research has shown particularly appeals to girls. "Rather than just say: 'You could be an engineer', we say: 'You could be designing buildings that are more carbon neutral, or you could be involved in renewable schemes that need engineering and tech skills,'" says Wollaston.

Some engineering firms are working hard to recruit more women. BP, for example, runs women-only recruitment days to attract female engineers, and also offers flexible working to retain its female staff.

The ideal candidate these days, says Wollaston, is one who has personal and communication skills as well as technical ones. "Having a combination of great people skills, great creativity and great technical knowledge will be a passport to a really good job - somebody with that combination of skills is going to be the most sought-after kind of person."

'There are so many ways into tech'

Emily Atkinson made the switch from English and philosophy to tech. Here's how she did it

Having a successful career in Stem doesn't mean spending your teen years coding in a dark room, as software engineer Emily Atkinson proves. She studied English and philosophy for her BA Hons at the University of Birmingham, which provided the inspiration for her next move - an MSc in computer science. "I'd found the logic modules in philosophy incredibly enjoyable, and had heard programming was rooted in similar problem solving," she says.

After her course, Atkinson continued to teach skiing in Japan, which she had been doing throughout her time at university. She explored tech jobs in Tokyo

before returning to the UK. A friend suggested the Silicon Roundabout jobs fair in London, where Atkinson encountered online printing and design company MOO. In July 2011, she joined the company as a graduate full stack software engineer and hasn't looked back.

Since then, she's worked in all aspects of software engineering, including front-end, mobile and back-end development. "I've been able to work on a number of different teams and really gain experience in all those different areas," she says.

"During my time at MOO I discovered I enjoyed back-end work most and now focus on that. I'm now a back-end software engineer at Conde Nast, working the platforms that power Vogue, GQ, Wired and Tatler."

But Atkinson also has what she calls her "side career". Four years ago, she co-launched and ran

a community for women in tech now known as DevelopHer. Initially, they ran events on tech topics.

"But we asked the community what they wanted, and we expanded into doing technical and soft skills workshops. For example, we ran a coding weekend for 100 women with two other organisations."

They launched a six-month mentoring programme with an event at Downing Street, taking 15 women and matching them up with a set of mentors. "We tracked their progress so they could feed back how they were doing, and it was incredibly successful," says Atkinson, who's now managing director of DevelopHer.

“We're all in this together and we all have the same goals for a diverse tech community”

"When we returned six months later, we brought 50 of our members and invited leaders from other women's groups in London. We're all in this together and we all have the same goals for a diverse and inclusive tech community."

Atkinson says that making those connections has been key to her career. But it's also vital to remember, she says, that there are many ways into Stem. "There are so many taster courses around, or you can go to events and talk to people about their careers. You don't have to do something in your early 20s or teens to pursue it as a career, particularly in Stem - it's a field where you can start at any age."

Interview by Lucy Jolin



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Your tech career starts here

Enrol on a degree apprenticeship and you'll be paid a worker's wage; you'll even have your uni fees taken care of. Little wonder, then, that more and more students are considering this route

The tech industry is facing a skills shortage. Although many jobs in the sector don't require an academic background in science, technology, engineering or maths (Stem), a high proportion do. So companies are taking matters into their own hands to encourage students, who may be worried about getting into debt, to study to degree level. If they can't find the candidates, they will help craft them and in many cases that means capturing the interest of students while they are still at school or college.

Cathy Baxter, PwC's Early Identification Talent Leader has helped develop a new technology degree apprenticeship programme at the company. Delivered in collaboration with the University of Birmingham and the University of Leeds, the new four-year course offers students direct industry experience, a salary throughout, and an honours degree in computer science at the end. On top of that, PwC pays the university fees.

"We recognised that we needed to find new ways to attract the best tech talent to create a distinctive workforce. Tapping into the



We designed the programme to encourage more school and college leavers to think about a career in technology

expertise of the universities was a great way to do that," she says. "Our programme is fully funded, so as well as paying for the degree, we bring students on board as a paid employee from the first day."

"Our innovative technology degree apprenticeship is the newest degree programme we've added to our Flying Start degree series," says Louise Farrar, head of student recruitment at PwC. "We designed the programme to encourage more school and college leavers to think about a career in technology and grow the future of the UK's technology industry at a much earlier stage, opening up careers to a wider range of students from across the country."

The universities benefit too, says Andy Bulpitt, senior lecturer in computer sciences at the University of Leeds. Commenting on the speed of developments in the tech industry, he draws a comparison between a traditional computer science course - which will equip students with the fundamentals of the subject - and the needs of industry, which are often more specialised.

"We've been working very

closely with PwC on setting up the programme," he explains. "They'll attend workshops that will be open to all computer science students, and those on the programme will get experience of working in IT, developing workplace skills and putting theory into practice."

Baxter is confident that after four years of learning about PwC and its work culture, the vast majority of students will be keen to stay. She notes that PwC has successfully been running university partnership programmes for 15 years to develop their assurance practice, and that "almost 100% of participants join us after they graduate." It's a proven win-win model, she says: "Our investment in students creates loyalty and means that their career trajectory is already on an upward curve when they graduate."

To find out more about PwC's Flying Start degree programmes visit: pwc.com/uk/flying-start



Graduates can count on maths

Mathematics graduates already have a vast amount of roles open to them - and as the importance of data continues to grow across all sectors, that number is only set to increase. By **David Benady**

Demand for maths graduates is soaring as technology, data and machine learning become the driving forces of our economy. From financial services to retail, from analysing sports data to drugs trials, a maths degree is a passport to a fascinating, well-paid career.

Almost two million people work in jobs where maths qualifications are essential and this figure is growing rapidly, according to the Council For Mathematical Sciences. Nationally, about 50% of people in jobs where a maths qualification is needed earn £29,000 or more, compared to 19% of the national population.

The range of career choices is vast for the maths bachelor of science graduate.

“A maths degree also equips graduates with a wide range of computing skills”

“A maths degree opens all doors - you can go into pretty much anything,” says Noel-Ann Bradshaw, faculty director of employability in the Department of Mathematical Sciences at the University of Greenwich.

“The jobs that are most popular are things like data scientist, statistician, and any sort of analyst - there are so many roles open in all sorts of companies with analyst at the end,” she says.

A bachelor of science degree in mathematics also equips graduates with computer skills, as they use a variety of software programmes in their studies. And they gain valuable experience in solving some tricky problems - an essential part of studying maths.

Maths graduates are suited for careers as systems analysts - examining how well computer software and hardware fits the needs of a business - or operations analysts, crunching data for the operations department in a business. They are as well placed to step up to management roles as they are versed in the key management skills of data and problem solving. Financial roles such as accountancy or actuarial work are also open to maths graduates.



Both theoretical and practical maths skills are in high demand in the thriving tech sector
Getty

Or they can do mathematical modelling on engineering projects. Then there is the academic route, involving research or teaching.

Bradford says different universities offer mathematics degrees with varying levels of theoretical and practical applications: “If you are doing a maths Bsc at a Russell Group research-intensive university, it is probably going to have a lot more pure maths than if you do it at a post-92 university [the former polytechnics], where maths tends to be more applied.”

Many of the jobs taken up by maths graduates involve a high level of statistics, which are usually taught as part of a maths master’s course.

Neil Sheldon, vice-president for education and statistical literacy at the Royal Statistical Society, says: “To enhance one’s position in the jobs market, people should build up their statistical skills.” He says some universities have considered offering statistics training to all undergraduates, as everybody needs to understand and interpret data these days. “Whatever you are doing, statistics is going to be a vital part of doing it well,” he says.

Emma McEntee

‘I wasn’t interested in the typical financial or teaching jobs’

Maths graduate Emma McEntee works as a biostatistician for Parexel International, which carries out drugs trials and studies on behalf of pharmaceutical companies.

Emma McEntee graduated with a Bsc in mathematics from the University of Greenwich, then took a master’s in medical statistics at the London School of Hygiene and Tropical Medicine. After leaving school, she knew she wanted to work with maths, but was unsure about which area, so she chose the Greenwich Bsc course, as it offered a 12-month work placement in the third year.

“I wasn’t interested in the typical financial or teaching routes. I wanted something a little bit different,” she says. “It just so happened that I landed a placement scheme at a large pharmaceuticals company.”

She decided biostatistics was the career for her. “I have had a lot of opportunities to work as a lead biostatistician on several studies, which means I am responsible for overseeing the statistics and computer programming activities for an entire clinical study,” she says.

Not bad for a career she discovered “completely by chance”. **DB**





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Calling online crime fighters

Global demand for cybersecurity professionals is increasing rapidly, along with the rewards accrued by those in the industry. **David Benady** finds out why the sector is booming



Cybersecurity tips

- Keep threats away from end users as much as possible by scanning inbound email content and web connections for malware.
- Protect the network perimeter with firewalls to make sure that only legitimate connections can come in.
- Accept that you are not going to keep out every single attack. If something penetrates your perimeter, you need to protect the internal system as quickly and smoothly as possible. That means identifying malicious and unusual connections and network vulnerabilities.
- Every employee needs to be made aware of the dangers of clicking on all email attachments.
- Decide whether you will ask employees to work only on company owned devices. Many organisations allow staff to use their own devices, but this increases the threat of being hacked. **DB**

Job prospects are booming in cybersecurity as the industry struggles to attract enough qualified staff. These shortages are undermining the security industry's ability to protect organisations and businesses from a sharp rise in data breaches, computer viruses and ransomware. By 2022, there will be a shortfall of 1.8 million cybersecurity workers globally, according to the Global Information Security Workforce (GISW) study. And the US Bureau of Labor Statistics predicts a 36% increase in demand for cybersecurity staff by 2024, twice the level of demand for other digital workers. The lack of supply is pushing up salaries, making cybersecurity one of the most lucrative careers in technology. Almost three quarters of UK security professionals earn more than £47,000 a year and 39% earn more than £87,000, says the GISW study.

Cyberattacks are becoming more frequent and more serious. This year's unprecedented WannaCry ransomware attack affected 230,000 computers in 150 countries. A spike in cybercrime is being fuelled by malware-for-hire,

Millenials are in high demand in the cybersecurity industry
Getty

which makes it easy for criminals to launch cyberattacks with computer viruses rented online.

"The new threats stem from the sheer number of devices connected to the internet and the logistical problems of managing those and making sure they have the right security systems," says Cisco System's Martin Lee.

“

The lack of supply means that cybersecurity is now one of the most lucrative careers in technology

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He says the industry is seeking staff with "Sherlock Holmes-type" investigative skills to identify and fight off threats: "The industry is increasingly looking for people who are monitoring what is going on and using the tools that are available to spot when something looks suspicious, then being able to investigate that," adding: "The key skill is this sense of wanting to find out why -

why is this like this, why did it go wrong and what are we going to do about it."

When Lee started in the industry 15 years ago, there were about a dozen pieces of malware appearing every day. Now, that rate has increased to 1.5m a day. "When there are a dozen pieces, you can do a lot of the detection code-writing by hand," he says. In the future, most of the donkey work of monitoring and protecting systems will be done automatically through machine learning algorithms. This will require staff to develop algorithms while others find new ways of combating the criminals and seeking out vulnerabilities in their systems.

Some 87% of cybersecurity workers globally did not start out in the industry, according to the GISW study - but many of them had worked in other areas of technology before gaining enough experience to enter this highly specialised field. But due to the looming shortage, of staff the cybersecurity industry is now making an urgent plea to the current generation of digital natives to get involved and join the fight to save the internet from the cybercriminals.

Online living

The 'internet of things' is transforming daily life - and the jobs market for graduates along with it, says **Mark Hillsdon**

The internet of things (IoT) is revolutionising how we live, from the way we control our central heating, to wearable fitness trackers that tell us how far we've walked. It's also beginning to usher in what has been dubbed "the fourth industrial revolution", as it transforms manufacturing processes from inventory management to quality control and assurance.

However, research early this year by satellite communications company Inmarsat revealed that many organisations lack the skills to develop, manage and deploy IoT solutions, especially in areas such as data analytics and cybersecurity. And that's good news for graduates.

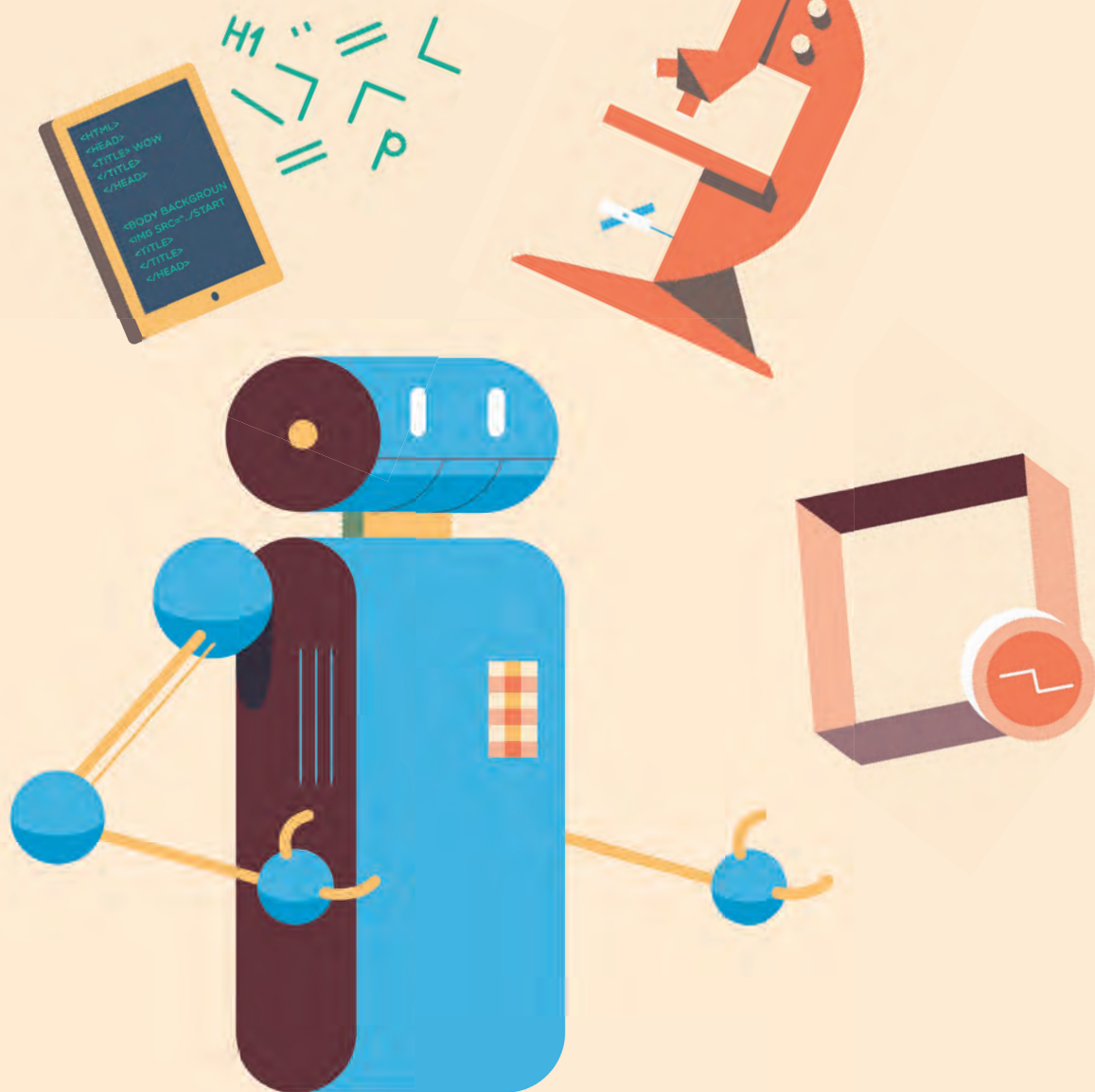
IoT is about devices, from simple sensors to smart phones, which talk to each other over the internet. "It's the use of technology to gather insights around a particular operation that can help you make smarter decisions," says Paul Gudonis, president of Inmarsat's Enterprise Business Unit.

When the technology first began to emerge, there was a rush to connect everything, explains Adam Gabrault, head of connected experience at global consultancy Virtusa. "In the early days of IoT it was almost a case of getting data from anywhere ... some people saw it (IoT) as a bit of a panacea that could solve all of their problems," he says.

Now businesses have moved on from this scattergun approach. Data is a new business staple, and as the technology has matured, so has the thinking about how to put this data to use. Sensors are now deployed more strategically, or to solve particular problems, and helping businesses to do this is where a new wave of tech-savvy graduates comes in.

With demand outstripping supply in the job market, skills in areas such as device and network security are crucial - as is the ability to analyse data. Employers are also looking for candidates with a strong knowledge of network administration and cloud-based solutions.

But technical know-how is only part of the picture - communications



“Companies are starting to take on graduates from a wide range of disciplines, including the arts”

and problem solving skills are important too, says Matthew Owen, managing director at the IoT connectivity provider, M2M Intelligence.

"They [graduates] certainly need to have the ability to comprehend the technologies being deployed, but far more important is their overall awareness of business and their attitude to working in a fast-paced and constantly changing environment."

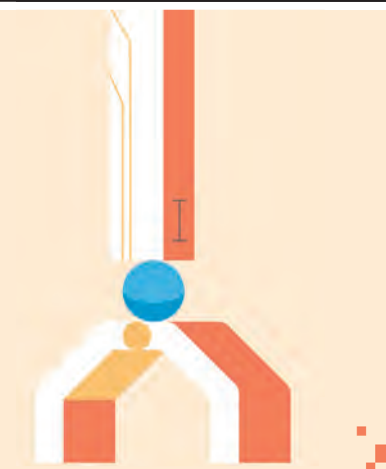
Companies are starting to cast the net farther afield, taking on graduates from a far wider range of disciplines. Virtusa often looks for people with a background in the arts, says Gabrault, because alongside their analytical skills, they are creative and can play a key role in user experience, and making sure

a product is actually something that people want to interact with.

Teamwork is also important. IoT is not about beaver away on solo projects, but involves interaction with other teams, end users and customers. "Candidates need to show that they can empathise with the client," adds Owen.

Helping students become "work-ready" is one of the driving forces behind Fast Track, a programme run by the Future of British Manufacturing. It matches students from some of the UK's leading universities with companies, to help them develop their next big innovation or connected product.

Melisa Kaner recently graduated in systems engineering at the University of Warwick and is now on a placement



The 'internet of things' What is it?

● Although the phrase was first coined in 1989, it's only in recent years that there's been a rush to connect up the world's devices.

● Research company Gartner predicts that by 2020 more than half of all major new business processes and systems will incorporate some element of IoT, with more than 20bn "things" connected and talking to each other across the world.

● The Boston Consulting Group also predicts that by 2020 B2B spending on IoT technologies, apps, solutions and systems is likely to have reached a whopping £223bn.

● IoT technology is already pushing fundamental transformations in many different industries - from energy, with the creation of smart networks and smart homes, to agriculture, where sensors in the soil can control irrigation systems and help save water.

with engineering firm Autodesk. There's a reality check, she says, between seeing what industry is really like, and the perception her course had given her. "I'm looking forward to finding ways to bridge that gap," she says.

She's also discovered that technology doesn't stand still. "Textbook skills like coding are important, but I feel like the willingness to learn and having a drive is even more crucial," she adds.

Gabrault agrees. "I think one of the most important mindsets for graduates is being really open to change," he says. "What you're going to be doing in 10 years is never going to be the same as today."

How to make studying work more for you

Demand for degree apprenticeships is set to increase, but will there be enough places on offer to plug the tech sector's skills gap?

With fees and debt making university life far less attractive to many young people, and businesses

struggling to fill vacancies in tech jobs due to a lack of suitable candidates, degree apprenticeships could be poised to shake up higher education and finally close the gap between learning and work. Degree apprenticeships were launched in October 2015, with those in technical and IT subjects the first to be trialled, says Ben Sweetman, director of apprenticeships at training provider QA. "IT is the perfect industry to break down that vocational divide, bringing together technical and academic learning," he says. "The hands-on aspect of a degree apprenticeship really suits the industry."

The Digital & Technology solutions degree apprenticeship is based on standards set by the Tech Partnership, a network of more than 1,000 employers that includes senior representatives from tech companies.

The courses are delivered by traditional universities and involve a mixture of online learning and regular workshops. What's crucial, says Sweetman, is the involvement of business, which allows them to ensure the courses cover what's going on out in the real world.

It's a view that's echoed by Anand Tailor, 20, and Dragana Ignjatich, 23 - two degree apprentices at Tata Consultancy Services currently working at PwC.

Tailor had a place at university which he decided not to take up. "I wanted hands-on experience within a professional environment and learning on the job," he says. "Even though you can do years in industry [as part of a degree], I thought it would be better to get myself straight into the workforce."

He agrees that degree apprenticeships are particularly suited to IT because they move with the times: "You could take a degree in IT and when you finish it will be totally outdated and new technology will have come out," he says.

Next year will see the launch of degree apprenticeships in cybersecurity and data science
Getty

Ignjatich also wanted more practical experience, having been left frustrated by her college course. "We spent just two hours a week in the lab - there wasn't time to learn anything," she explains. "In IT, the most important thing is that you see how things are done and you do them yourself."

Sweetman regularly speaks to companies that are struggling to recruit software developers and data analysts, and believes degree apprenticeships are becoming a more and more important channel to bring in new talent.

"There's a huge numerical imbalance between the number of skilled people out in the workforce and the number of vacancies available that companies are struggling to fill," he says.

“Degree apprentices very quickly become highly valued and contribute to the company”

Bob Clift, head of higher education programmes at the Tech Partnership, believes there are other great benefits for employers: "Degree apprentices very quickly become highly valued and contribute to the company."

Next year will see the launch of two new degree apprenticeships, in cybersecurity and data science, that have been specifically developed to plug these gaps, along with a master's programme that is currently in development.

Yet while around 30,000 people completed computer science degrees last year, there are currently only around 1,000 degree apprenticeships available, covering 24 different subjects.

However, Clift warns that due to their growing popularity, there may not be enough degree apprenticeships to go around. "Companies only take on a certain number and depending on the economy, sometimes they can only take very few," he says. **MH**



2016
Promoted to Senior Associate

2015
Started an Information Security Master's sponsored by PwC

2014
Joined the PwC Cyber Security graduate scheme

2013
Backpacked around Southeast Asia

2013
Completed a Master's in Wireless and Optical Communications at UCL

2012
Graduated with BSc Electrical Engineering from University of Liverpool

Senior Associate

*Siming's story,
Senior Associate*

Your career starts here

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