

STEM

Careers Booklet



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Foreword

Skills in Science, Technology, Engineering and Maths (STEM) are crucial to our current and future economy.

Labour market forecasts continue to show that employer demand for higher level skills in STEM will grow in the short, medium and long term. It is broadly recognised, by Government and industry alike, that the future success of the Northern Ireland economy will require an increased number of skilled workers with STEM skills.

A key part of my Department's work has been to engage directly with business in communicating to you - students, parents and teachers - the importance of STEM skills, the breadth of opportunities available following STEM study and the transferability of the skills you will acquire as a STEM graduate.

This booklet draws together profiles of people who have studied STEM and gone on to success in the sector. They demonstrate the breadth of opportunities available through studying STEM subjects, highlighting careers in each of the four disciplines, with contributors discussing their career paths and describing the diversity of their work.



In addition to the STEM jobs profiled, students and their primary influencers should consider the broad skill base studying STEM will provide. In addition to the technical skills required for work in the sector, students will acquire skills which are highly sought after by employers in all fields, such as problem solving, communication and analytical thinking skills. As highlighted later in this booklet, research has shown that there is significant earnings potential attached to STEM skills, with better than average earnings outcomes than those with other degrees.

With this in mind, my Department has sought to secure the supply of STEM skills, despite the increasing pressure on public sector spending. Since 2011 my Department has secured over 1400 additional undergraduate and 234 additional postgraduate places in STEM and economically relevant

subject areas. I have also sought to expand the access routes to higher level skills through the introduction of higher level apprenticeships, an integral part of 'Securing our Success', the new Apprenticeship Strategy for Northern Ireland.

I would encourage you to follow study in STEM subjects, whatever stage you are at in your education or career pathway. Continued education within the STEM subject areas will equip you with the broadest skill base, keep your career options open and not only enhance your own potential, but will ensure you can play an important role in this exciting and growing area which is crucial to the future success of the Northern Ireland economy.

Dr Stephen Farry MLA
Minister for Employment
and Learning

About the STEM Business subgroup

The ‘Success through STEM’ Strategy (2011)¹ identified 20 recommendations needed to increase the number of young people in Northern Ireland who qualify with STEM skills, in order to meet the growing demand for these skills in the economy. Five of these recommendations were assigned to industry. The STEM Business Subgroup, chaired by Dr Joanne Stuart OBE, was set up to implement these recommendations, which included developing a clear STEM career path. In November 2012 the Department for Employment and Learning funded the seconded post of STEM Business Co-ordinator, to support the subgroup to deliver on the recommendations.

Since then, with the cooperation and support of STEM businesses and STEM delivery organisations, five STEM supplements have been published in the main daily papers in Northern Ireland: Belfast Telegraph, Irish News and News Letter. The supplements have been timed to coincide with the major decision-making times in the school year: September for Year 14 UCAS forms and February for Year 10 and 12 GCSE and A-level choices.

This STEM Careers booklet draws on the idea of profiling STEM role models, which was developed through the supplements and is designed to provide a more long term resource for parents, teachers and young people.

Feedback and Further Information

The STEM Business Subgroup would welcome any comments or queries that you may have about any aspect of this booklet.

e-mail: successthroughskills@delni.gov.uk

1. <https://www.delni.gov.uk/publications/stem-publications>



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Introduction

World class STEM Opportunities exist across the whole of Northern Ireland

What is STEM and why is it important?

In common with most economies, Northern Ireland recognises that it needs an increasing number of skilled workers with qualifications in Science, Technology, Engineering and Mathematics (STEM). The Northern Ireland Executive's Programme for Government for 2011/15² identified as an economic priority the need to increase the uptake in economically relevant STEM places. In 2011, the Skills Strategy for Northern Ireland, 'Success through Skills - Transforming Futures',³ said 'There will be an increased need for people with qualifications in STEM (excluding subjects allied to medicine) at all levels. More recently, in 2012, 'the need to increase skills in subject areas important to the NI economy such as STEM' was reiterated in the Northern Ireland's Executive Economic Strategy.⁴

In Northern Ireland some employers, who require STEM skills, are already experiencing difficulty recruiting and retaining enough staff with the required level of qualifications and skills.

Demand for STEM skills

There is evidence that employers across the UK cannot get the skills that they need. According to the UK Commission's Employer Skills Survey 2013,⁵ which also surveyed in Northern Ireland, 43 per cent of vacancies for professionals working in science, research, engineering and technology are hard to fill due to skills shortages. This is almost twice the average for all occupations, which is 22 per cent.

A more recent report by the UK Commission for Employment and Skills entitled 'Reviewing the requirement for high level STEM skills'⁶, published in July 2015, said there are

2 <http://www.northernireland.gov.uk/pfg-2011-2015-final-report.pdf>

3 <https://www.delni.gov.uk/publications/success-through-skills-transforming-futures>

4 <http://www.northernireland.gov.uk/ni-economic-strategy-revised-130312.pdf>

5 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/327492/evidence-report-81-ukces-employer-skills-survey-13-full-report-final.pdf

6 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/444052/stem_review_evidence_report_final.pdf

2.8 million high level STEM jobs in the UK. Of these, there are close to one million IT professionals, with the next biggest grouping being engineering professionals, then managers, STEM technicians, IT technicians and scientists. With IT and engineering professionals making up the majority of those employed in STEM posts, the demand for those skills is high too.

The demand for STEM qualified candidates has also been highlighted by the CBI/Pearson Education and Skills survey: Inspiring growth⁷ from July 2015 which states that:

- businesses report that there are widespread difficulties in recruiting people with STEM skills at every level, from new entrants to train as apprentices (20%) to people with more than five years' experience of STEM related work (32%);
- if those business expecting difficulties in three years' time are added to those currently experiencing problems, over half of businesses (52%) see a shortfall in experienced STEM-skilled staff; and

- a degree in a STEM subject gives graduates a clear advantage in the jobs market, with two in five employers (40%) reporting that they prefer STEM qualified graduates, and businesses want to see a boost to both the number of STEM graduates (38%) and their quality (29%).

The 2015 UKCES' Review report (ibid) also states that the demand for STEM skills is widespread, extending to occupations and sectors not traditionally viewed as being STEM-based. The foundation competencies that underlie STEM skills are marketable. The report gives as an example the way in which STEM skills (specifically mathematics) are required to support innovations in financial modelling in the finance sector.

Locally, the Department for Employment and Learning has commissioned the Ulster University to develop the Northern Ireland Skills Barometer, which has highlighted the shortage of STEM skills at degree level and also at Foundation Degree or HNC/HND Level. The subject areas which have the greatest shortfalls for degree levels skills are Engineering and Technology and Maths and Computer Science.

It is recognised that STEM skills are, and will continue to be, very much in demand.

7 <http://news.cbi.org.uk/reports/education-and-skills-survey-2015/education-and-skills-survey-2015/>

How is Northern Ireland World class in STEM?

Did you know that.....?

- 1 in 5 computer drives has a part created in Northern Ireland by Seagate, Londonderry;⁸
- 1 in 3 London buses is made in Northern Ireland by Wrightbus, Ballymena;
- 1 in 3 of the world's aircraft seats are made in Northern Ireland by B/E Aerospace, Kilkeel;
- 40% of the world's mobile stone crushing and gravel screening equipment is made in Northern Ireland, mainly in County Tyrone;
- 50% of the worldwide market for tyre pressure monitoring sensors is produced by Sensata Technologies (formerly Schrader Electronics), mostly from their factories in Antrim and Carrickfergus;
- 1 in 4 of the world's full scale marine energy prototypes have been developed, tested or manufactured in Northern Ireland; and
- Belfast is Europe's leading destination city for software development and technical support investment.

Some of the world leading global brands which have located in Northern Ireland include Seagate Technology, Bombardier

Aerospace, B/E Aerospace, Caterpillar, Allstate Northern Ireland, Liberty IT, Microsoft, HCL Technologies Abbey, Citi, DuPont and Allen & Overy.

We are fortunate in having many world class indigenous companies such as Almac, Randox, Norbrook, First Derivatives, Creative Composites, Kainos, Asidua, Kelvatek, Andor and HeartSine.

Why are not enough people studying STEM courses?

Recent research released by Nestlé UK & Ireland in 2014⁹, from a small study, revealed a stark gap between 14 to 16 year olds' enthusiasm for science and maths and UK businesses' ability to hire the STEM employees they need.

Of those surveyed, nearly two-thirds of STEM-related businesses (62%) said they do not believe there are enough young people studying STEM subjects to meet future demand. Yet, Nestlé's research, conducted by Populus, showed that nearly four out of five (78%) 14 to 16 year olds say they would consider a career in a STEM-related industry, with over half (57%) citing a good salary as the main motivation. However, more than half (51%) say they know little or

⁸ <https://www.investni.com/index.html>

⁹ <http://www.nestle.co.uk/media/pressreleases/stem-career-opportunities>

nothing about the types of jobs that are on offer, with fewer females (41%) aware of career opportunities in a STEM-related field than males (58%).

Populus surveyed 100 science and maths teachers and tutors at UK secondary schools and colleges, and found that over half (52%) of those surveyed said that they did not know what STEM-related businesses are looking for in new recruits.

In Northern Ireland, the Careers Review 2014¹⁰ emphasised the importance of Continuous Professional Development for careers teachers and careers advisers to maintain their awareness of labour market needs. With the support of business, the Education Authority ran a series of 'STEM in Action' events for STEM teachers and careers teachers to improve their knowledge of opportunities in local STEM companies.

Nestlé's research also showed how businesses in the UK are taking on responsibility for the promotion of STEM-related careers amongst young people in the UK. Over a third (37%) are taking an active role in promoting STEM skills, while nearly a third of those (29%) are opting for school and college visits as a way of engaging with the future workforce.

Locally, the CBI published a report in 2014 entitled an 'Evaluation of Education and Employer Partnerships in Northern Ireland'¹¹, which notes that many companies do support STEM activities in schools and encourages businesses to engage with education in a more structured way, to support a 'Teachers into industry' programme and to provide work experience of longer than one week's duration.

This document is designed to provide information about STEM careers from staff working in STEM businesses for parents, teachers and young people.

Family Role in STEM Career Choice

In a large longitudinal study of younger children aged 10-14, the 'Aspires' report¹² from King's College London said that family 'science capital' is key. They found that families exert a considerable influence on students' aspirations. This influence operates in many ways, but a key factor affecting the likelihood of a student aspiring to a science-related career by the age of 14 is the amount of 'science capital' a family has. Science capital refers to science-



10 <https://www.delni.gov.uk/publications/review-careers>

11 http://www.cbi.org.uk/media/2588820/item_5_-_cbi_business-education_report-final.pdf

12 <http://www.kcl.ac.uk/sspp/departments/education/research/aspires/ASPIRES-final-report-December-2013.pdf>

related qualifications, understanding, knowledge (about science and ‘how it works’), interest and social contacts (e.g. knowing someone who works in a science-related job). Longitudinal tracking showed that students with low science capital, who do not express STEM related aspirations at age 10, are unlikely to develop STEM aspirations by the age of 14.

The report recommended that is important to build science capital with students and families, as it is thought to be beneficial for encouraging more young people to continue with science post-16. The report stated that it is important for students and families to understand that studying science ‘keeps your options open’ and that STEM qualifications have high transferable value and can be a springboard to numerous possible careers. Science is part of our everyday lives and is therefore of importance to everyone.

How does having a STEM qualification increase employability?

STEMNET¹³ worked with a range of STEM employers to identify their Top 10 employability skills. These are the skills which they look for in potential employees, in addition to good technical understanding and subject knowledge. They are:

- communication and interpersonal skills;
- problem solving skills;
- using your initiative and being self-motivated;
- working under pressure and to deadlines;
- organisational skills;
- team working;
- ability to learn and adapt;
- numeracy;
- valuing diversity and difference; and
- negotiation skills.

Many of the skills identified by STEMNET can be acquired through a STEM course and are thus going to make STEM trained people more employable, as was confirmed by the 2015 CBI/ Pearson report (ibid).

This report also emphasised the importance of relevant work experience and attitudes to work to the employability of young people. Many businesses have recognised this issue and offer work experience, internships, project work and placement opportunities to increase engagement with young people and improve their employability.

Locally, the Northern Ireland Skills Barometer has underlined the need for job applicants to have generic employability skills.

13 http://www.nationalstemcentre.org.uk/dl/37a3db873d39b3e0d8875bdd7c26f3f05a45770d/3058-Employability_skills_guide.pdf



The report emphasised the importance of the role that businesses have to play in providing internships and placements, so that these skills can be developed. Several of the people profiled in this document mention the benefit of these types of opportunities.

Are STEM Jobs well paid?

The UKCES report 'Reviewing the requirement for high level STEM skills' (ibid) states that 'those working in STE (science, technology, engineering) occupations earn a great deal more than those who are not in STE occupations (an estimated 19 per cent), although this is less so for science and more so for technology and engineering.'

The 'Tomorrow's Engineers' website echoes this and states that people who graduate from university with engineering and technology degrees earn approximately 20% more per year than the average salary¹⁴ for all graduates and can expect to earn significantly more over their lifetime than graduates from most other subjects. Those who do an apprenticeship in engineering and become engineering technicians also have the potential to earn considerably more than the average technician.

On behalf of the Department for Education, London Economics conducted a longitudinal study¹⁵ of a cohort of people born in a single week in 1970 in England, Scotland and Wales. The study analysed that while studying STEM subjects benefits people across the board, women's wages are disproportionately boosted by gaining qualifications in these subjects.

The landmark research by London Economics shows that achieving two or more A levels in STEM subjects adds 7.8% to a man's earnings, when compared with gaining only GCSE-level qualifications. The returns for women are much higher, with earnings being boosted by 33.1%.

14 https://www.tomorrowsengineers.org.uk/Engineering_facts/

15 <http://londoneconomics.co.uk/wp-content/uploads/2015/03/London-Economics-Report>Returns-to-GCE-A-Levels-Final-12-02-2015.pdf>

The Knowledge Economy Index Report 2015¹⁶ published in September 2015, provides a barometer on the health of the Knowledge Economy in NI, which includes the STEM Industries. The report confirmed NI as the second fastest growing Knowledge Economy across the UK, with Knowledge workers earning salaries 50% higher than the NI average.

In these difficult economic times, it is perhaps all the more important to get value from one's investment in education and it may be of interest to parents and students alike to note that some businesses will help to support students through their STEM course, with a scholarship or bursary and perhaps summer employment. Some of the people profiled in this document have benefitted from business support whilst studying.

What sort of jobs are there in STEM Businesses?

It can be difficult for young people and their parents to understand what sort of opportunities there are in STEM, especially if they do not have family members working in the area.

Over the last two years, we have published a series of profiles of local people, who are working in various STEM industries, in STEM supplements with the main local papers.

In this guide we have listed the posts that people occupy under the chapter headings of Science, Technology, Engineering and Mathematics. Following the advice of careers teachers, we have tried to place the posts within the chapter alphabetically, to make it as accessible as possible. Whilst Mathematics underpins many of the jobs in STEM, we have chosen to profile several people who have qualifications specifically in Mathematics.

It is important to remember that STEM jobs also exist in the public sector, the health service, academia and teaching, but in this booklet we are concentrating on those in industry.

16 <http://nispconnect.org/wp-content/uploads/2015/09/NI-KEI-Report-2015Final.pdf>



Science

Careers





Introduction

We are familiar with the three main school science subjects of Physics, Chemistry and Biology, but at college and university level these subjects can become more and more specialised into different aspects of the main subject and so, too, can the careers that they lead on to.

For example, Physics can be combined with astrophysics, computing or medical applications. Chemistry can be studied in combination with Biology to become Biochemistry and with Engineering to become Chemical Engineering, which is covered in the Engineering section of this booklet. Biology can be further specialised into Human or Marine Biology, Microbiology or Biomedical Science, for instance. The courses can thus become specialised to match the careers that they help prepare people for, but sometimes individuals specialise in certain areas after they take up employment.

Employment can be at graduate level or technician level and further study, whilst in employment, can support career progression.

Biology

Biologist

Keeva McClelland PhD

Senior Biologist drug discovery / oncology, Almac Discovery Ltd



Describe the balance of office and laboratory work

I am a senior biologist working in drug discovery research & development at Almac Discovery Ltd. My role is to use biological techniques to evaluate potential anti-cancer drugs, developed by medicinal chemists within the department. A typical week will begin with a group discussion of day to day plans, setting new objectives and reviewing recent publications related to projects. My time is then divided between the lab and the office. In the lab, I carry out a variety of biochemical, cellular and molecular experiments, which can take a matter of hours to several days to complete. I will then analyse results and present findings, so the team can evaluate the projects progression. Throughout each week, there will also be opportunities to attend talks by colleagues, clinicians and visiting researchers to hear about their latest research. I am also a STEM ambassador and may be involved in an outreach programme, such as setting up a classroom experiment in a local school, or attending a careers event.

What has been your route to this post?

A-Levels: Biology, Chemistry, Computer Science

Undergraduate: First class (Hons) Applied Biochemical Sciences (University of Ulster)

Postgraduate: PhD Molecular Biology (QUB)

Postdoctoral Fellowship: Research fellow at the Centre for Cancer Research and Cell Biology (QUB)

Senior Biologist: Drug discovery biologist (Almac Discovery, Craigavon and Centre for Cancer Research and Cell Biology QUB)

Would you say that being a Research and Development (R&D) Biologist represents a good career?

Research and development in any field is an interesting career, but it is also highly competitive and requires self motivation. Salaries in STEM posts are comparable to other fields with similar educational criteria. Companies will generally offer structured career paths, for example, progression to technical leadership, or senior management positions and support any requirements for further training.

How does being an R&D Biologist make the world a better place and do you find your job satisfying?

As in most experimental research, there are high and low points to the daily tasks we undertake, if we knew the hypothesis was right every time, there would be no need to do the experiments! Job satisfaction comes from completing a project to the best of my ability, not being deterred by negative results and enjoying the successful moments. This is not an easy field, as many drugs will not proceed past clinical trial phases. If I can contribute to the development of even one product that makes it to the clinic, that will be an amazing achievement.

What do you really like about your job?

I like the variety that this jobs offers. One day is never the same as the next and each project is different again. I am continually developing my knowledge and skills, whether through new techniques in the lab, or in the office mastering various computer programmes. As part of a new collaboration, we now have the opportunity to work within Queen's University, which allows us to interact with other researchers and medical staff, combining skills and expertise to create new opportunities in drug discovery.

Can you say anything about the future job prospects in your industry?

The manner in which we approach the challenges of treating diseases is undergoing a lot of changes. Multidisciplinary teams combining chemistry, biology and computational skills play leading roles in new projects. A wider variety of scientific disciplines are becoming involved in the research and development process, offering new techniques and flexible solutions. In particular, methods to handle and interpret the vast amount of data being generated in the industry have given significant rise to the need for computational biologists.

Would you recommend what you do as a drug discovery biologist to other young people?

Drug discovery / oncology research is an ever evolving field. The drive to advance our knowledge and technologies provides great opportunities and I would highly recommend it to other young people. In general, a STEM background develops transferable skills that can be applied to a range of future careers, with opportunities in industry, or academia, or a combination, as is becoming the preferred model for drug discovery. And as often is mentioned, we need more entrepreneurs and STEM subjects provide a great base for starting your own spin out company! ◆

Biology

Almac Laboratory Team Leader

Thomas Delaney

Laboratory Support Team Leader in the Almac Diagnostics Business Unit



How did your career start out?

I have 15 years laboratory experience to date and in this time I have had quite a varied career. After completing my A-levels, I initially started out as a technician within the Belfast City Hospitals Medical Genetics department. The work here inspired me to embark upon an Open University Degree in Life Sciences, which I completed in 2005. Whilst progressing through my degree, I changed jobs to pursue a career in the education sector. I took up a role as a science technician with the Belfast Institute of Further and Higher Education (now the Belfast Metropolitan College). After completion of my Honours degree, I was able to take up the role of part time lecturer, teaching various modules on the HND in Applied Sciences. During my time as a lecturer, I was able to take a secondment, facilitated by the Learning Skills and Development Agency of Northern Ireland which allowed me to enter into an industrial field, with the goal of bringing back valuable industrial experiences that can then influence the teaching curricula. I was lucky enough

to secure my placement within Almac Diagnostics, where I was placed into the very busy sequencing team for six weeks. I thoroughly enjoyed my placement time and as a result, I decided that a career in this field was something that I wanted to focus on. In 2008, I took up a technical role within Almac Diagnostics and since then my career has progressed from technician, to laboratory supervisor, to my current position of Laboratory Support Team Leader.

Can you tell us a little about your postgraduate education?

While working within Almac Diagnostics, I was able to take up a part time post graduate masters course through the University of Greenwich, London. This course is an MSc in Biomedical Sciences and I am due to complete this course in the summer of 2015. The modules I have been able to study during this course have very closely matched my current role and the work that is done within Diagnostics. There was a good mix of molecular biology, equipment

and laboratory management and quality systems management. Because the modules I have chosen to study match my day to day work so closely, I feel this has made me a much more effective employee and I have been able to work with all aspects of the company, from business development through to project management, validation, quality, finance and, of course, molecular biology research.

What does your current role involve?

I am now the Team Leader for Laboratory Support, which is an integral team within the wider Operations department. Within this role, I have the opportunity to work with many different teams and platforms, such as DNA Microarrays, qPCR, Immunohistochemistry, Sanger and Next Generation Sequencing. I also have the opportunity to work with human mammalian cancer cell lines and tissue histological processing. In this role, I am responsible for the management of a team of laboratory assistants and I am also responsible for the general day to day running of the laboratories. The team's main responsibilities are the maintenance and calibration off all of the laboratory equipment and technologies. I am also responsible for sourcing and implementing new technology platforms within our laboratories and I see this right through from purchase to delivery, implementation and validation release. Another main priority for me in my

current role is the coordination and management of stock control, ordering and receipting goods. This is a very important role for the smooth running of an efficient laboratory setup. I have also taken on the role of Health and Safety representative and I have project-managed major infrastructure projects for the benefit of the laboratory function.

Would you recommend a career in this area?

Absolutely, it has been the best career move I have made. The sector has so much to offer a potential employee. The future looks very bright for biomarker discovery and test delivery and I hope to be able to develop my career as the business grows. ◆

Biology

Geneticist

Ruth Patterson

Biochip Custom Unit Scientist,
Randox Laboratories Ltd.



What does a typical day in your job involve?

Day to day work as a research and development scientist is extremely diverse and can be mainly structured into practical laboratory work and interpretation of results. Here at Randox, I work in the Custom Biochip department, so my role focuses on the development of new tests for medical diagnosis and research. The platform we use for this is our unique Biochip Array Technology, which uses specific antibody or DNA to detect proteins or antigens in blood, urine and saliva samples.

The tests developed are used both clinically for the direct diagnosis of disease such as heart attacks, diabetes and bone disorders and also are used by research institutions to aid in the development of new treatments.

What do you like most about your job?

Projects begin with experiment design and move into the lab to gather the required data. This balance of applied

theory and practical skills makes the job feel very hands on and the feeding of results back for analysis makes your daily work feel purposeful. As I design custom biochips, I carry out extensive amounts of lab work every day and also analyse and interpret results. Randox is a global company and as such the opportunity is available to travel internationally. This past year, I was able to travel to Boston and Denver in the USA to work with customers there in universities and research institutions. The work is satisfying, as we are at the forefront of revolutionising healthcare and diagnostics, which has a direct impact on people's lives.

I view my job as a great career prospect, as no two days are the same; the work is extremely diverse and can very challenging, but also rewarding. The opportunities presented for personal and career development are not seen across many other career pathways, which can be quite restrictive, once qualified.

Did you always know you wanted to work in Science?

When choosing my career, even as far back as choosing subjects for my GCSEs, I had a clear view of where I wanted to get to and I chose subjects which would lead me to that destination. Science was always my strength academically, but in addition to that it was also something I was personally enthusiastic about. This greatly influenced all my choices, as I felt it was important to pursue a job which I would enjoy. However, it is always important to allow for flexibility and a degree in science and the skills you develop are well respected by employers, so it is easy to slide in to a position which is perhaps more business orientated, or even into science interface subjects with IT or maths.

What are the skills needed for Research and Development and what is your own academic background?

The skills required to work successfully in a research environment are initiative, organisation and to be a logical thinker. As well as these attributes, the academic requirements are well defined; I personally studied triple award science at GCSE level and Biology, Chemistry and Physics for A-level. This led me to my BSc (Hons.) degree in Biological Sciences at Queen's University, Belfast, in which I focused on genetics. A life sciences degree is essential for this career choice.

What do you feel about the future job prospects available in the Life Sciences industry?

The potential of the science industry and the prospects for future job opportunities within it are vast. The diagnostics industry in particular is recession-proof and the global market continues to expand exponentially. There will always be a position for research and development, healthcare can always be improved and increasing knowledge and ability in the sector means work will continue to advance. Pursuing a job in science would provide excellent opportunities for a young person and a rewarding career. ◆

Chemistry

Chemist

Heather Mawhinney

NI Station Chemist, AES - Kilroot and Ballylumford Power Stations



Can you describe a typical working day?

There is no such thing as a typical day – every day is different. I manage the laboratory and water treatment plant teams at Kilroot and Ballylumford Power Stations. In my role, I am responsible for the production of ultra pure water on both sites and the process water chemistry in the CCGT (combined circuit gas turbine) and conventional fossil fired power plants. I carry out atmospheric testing and provide advice and information on chemical safety-related issues. I am also heavily involved in environmental monitoring, as required by our permits. The laboratory provides a technical support service function across both sites, performing routine and ad hoc analysis, such as fuel and lubrication oil testing. Additionally, I get to spend time working on outage, commissioning and project development work.

What has been your educational/ professional route to this post?

After completing my A- levels in Chemistry, Physics and Mathematics, I went to study at Queen's University, Belfast, where I completed a BSc (1st class honours) and PhD in Physical Chemistry. I also have an MSSc in Occupational Safety and Health, which I gained whilst in employment. I worked in a research and development role at Queen's University, Belfast and in a technical position in Invest NI, before joining AES Kilroot Power Station as an Industrial Chemist in 2008. Over time, my role has developed and I have been in my current position for just over one year now.

How does your work as Station Chemist make the world a better place?

I play my part in keeping the lights on in Northern Ireland!

What do you really like about your job?

I love the variety of my job and the fact that it pushes me and challenges me. I am continually learning and have been given the opportunity to progress. I like the fact that my job is not solely office based, as I spend time in the laboratory and on the plant. I also get the chance to work alongside a wide variety of people.

Can you say something about your perception of future prospects in the power industry?

The energy industry is an essential part of our economic and day to day future. The industry is experiencing significant change, as legislation and customer preference moves us towards greater use of renewable and decentralised energy as part of an integrated energy system. There are great prospects for people coming into the industry, as the mix of generation required to support security of supply, decarbonisation and affordable energy will create and sustain jobs.

How do you balance your career with your personal life?

The 24-7 nature of the power industry means that my job is not a typical 9-5 one and you need to be flexible. However, I realise time is precious and try to successfully balance work and my personal life.

Do you belong to any professional body and what benefits does that offer you?

I'm a member of the Royal Society of Chemistry and the British Occupational Hygiene Society. Membership of RSC and BOHS helps to keep me up to date with the chemical sciences and occupational hygiene; they provide professional subject support and promote professional development via their Continuous Professional Development (CPD) programmes.

Would you recommend your area of work to other young people?

Yes – it's both a challenging and rewarding career and is particularly suited to anyone with a STEM background. ◆

Chemistry

Analytical Chemist

Nadine Murray

Group Leader Analytical Support
Department, Almac Pharma Services



What does a typical day in your job involve?

I work as a Group Leader in the Analytical Support Department within the Almac Pharma Services division of the Almac Group.

The Analytical Support Department's function is to support the formulation and development of mainly tablets and capsules, by analysing these products for other pharmaceutical or Bio-tech companies based around the globe.

Over the last 12 years, my role has developed and I now manage a number of analytical teams that form one of two groups in our department of approximately 80 people.

As I am now office based rather than in the laboratory, my day begins with following up on e-mails that have come in from clients the previous evening. There will also be a number of meetings to prepare for and attend throughout the day. The meetings are mainly focused on ongoing projects, providing and interpreting data, then deciding on the best way forward for the project with the rest of the project team.

Other parts of my day may involve mentoring and advising staff on certain projects, quoting for potential business, updating and implementing improvements to current working processes and procedures and often conducting interviews, as our department is continually expanding, which is great.

What do you really like about your job?

I really like the problem solving challenges with my job. These may be technical challenges, or timeline driven obstacles. I also enjoy the fact that no two days are the same and I am constantly faced with different experiments and problems to solve. This helps keep me motivated and focused on my role.

I also like that fact that other than the analytical side of my role, there are business aspects, ensuring we are on target and all costs have been accounted for whilst ensuring team members are performing and are happy in their roles. As I have progressed in my career, the business and human resource management elements have become a larger part of my role.

This ensures that I am continually developing my knowledge and skills to become a better leader and manager.

Did you always know you wanted to work in Science?

Yes, from an early age at school I was always interested in the natural world and my surroundings. I did not know which area of Science I wanted to progress in. However, as I was strong in Science subjects and was interested in them, I therefore found Science easier to learn.

What are the skills needed for working within the Analytical field and what is your own academic background?

To work in this area, you do as it suggests, need to be analytically minded: logically approaching problems and not being despondent when things don't work out! It's Science after all, so things often don't go as expected. However, this in itself keeps me interested.

I think that being practically minded has also helped me in my role; often in the beginning, work involved troubleshooting problems with equipment and mastering certain software programs to ensure analysis was conducted in the required timeframe. Often, there are conflicting priorities, so being able to multi-task, also work on your own and in a team environment are very important, as well as being organised.

With respect to my academic background, I attended Portadown College, where

I studied 'A' level Biology, Chemistry and Geography. This led onto studying for a BSc (Hons.) in Applied Biochemical Sciences at the University of Ulster, where I focused a lot on the Analytical Chemistry and Biochemistry aspects of the course.

What do you feel about the future job prospects in the Analytical Services Group within the Pharmaceutical Industry?

There will always be opportunities in this area as drug products will continue to be developed and manufactured. These products need to be assessed for safety and efficacy before they reach the marketplace, so laboratory testing is required on every batch of material that is made.

Even though this is one small part in the drug development pipeline, it is satisfying to know that the work being performed is helping come up with new medicines that will help to cure many diseases.

Would you recommend Analytical Chemistry to other young people?

I would certainly recommend this to young people that enjoy Science, as I thoroughly enjoy my job. Even if it is not in the analytical arena, there are a wide range of disciplines that make up a pharmaceutical company like Almac. Therefore, there will always be the requirement for scientists that are keen problem solvers and are enthused by a fast paced working environment, focused on reaching goals and targets. This type of work is a rewarding career path for dedicated individuals. ◆

Physics

Physicist

Dr Debra McNeill

Managing Principal Engineer, Seagate



Can you describe a typical working day?

I work as Product Design Manager for Seagate's Notebook products, which involves ensuring successful integration of transducers (read-write heads) into hard disc drives to meet product requirements. I usually start work around 8:00 am. This allows me to catch up on emails that I will have received overnight. Northern Ireland is ideally located from a time-zone perspective—all Seagate component test factories, drive factories and design centres with which the Springtown facility deals directly, are located in the Far East, so we have overlap with them first thing in the morning. This allows us to set up conference calls and video conferences, as opposed to relying on e-mail communication. Then, during our afternoon, we can communicate directly with other Seagate partners in the US.

Each day will be peppered with set meetings, which invariably involves sharing and discussing recent data, planning next course of action, or providing status updates. We will have set timelines for qualification of particular products in order

to be competitive in the market, so there is always a timing consideration to decisions.

Communication and systemisation is critical in this role. We sit in an open plan office, so there is always a lot of informal technical discussion going on at any one time. I try to leave the office by 6pm every day. Given the cross-functional nature of my role, I am required to travel to face-to-face meetings with customers and other sites. Currently, the primary destination is South Korea, although in the last few years I have touched down in Thailand, Malaysia, Singapore and the US several times.

Would you say that product design engineering represents a good career?

Yes, Seagate has a performance-related pay structure and offers a very competitive salary with opportunity for bonuses, as well as a comprehensive benefits package that includes private health care and a Seagate share purchase scheme.

How does product design engineering make the world a better place?

It's exciting to work in a job where I can physically see the results of my efforts, in the form of technology advances in

each generation of computer hard drives. Seagate is the largest volume supplier of hard drives in the world and I'm very proud to be a part of that. It is also important to remember that development of this hardware (specifically Notebooks in my case) enables many other professions across the world to work more efficiently and effectively 'on the move'.

What has been your educational route to this post?

I attended Thornhill College, Derry, where I studied A-level Maths, Physics and Geography. I then did a Physics degree at Queen's University Belfast, followed by a Masters in Optoelectronics and Optical Information Processing, and a PhD in Condensed Matter Physics (Surface Plasmons Enhanced Laser Ablation of Metallic Thin Films).

Did you have a role model in mind when you chose your degree?

There weren't many role models for women in science at the time I was making my subject choices, but I chose Physics as it was always the subject that represented the biggest challenge. I was also confident that having a background in Physics would open doors for me for a choice of career later on.

What do you really like about your job?

I really like the diversity. Every day is different and working at the leading edge of technology there are always issues requiring resolution. I also like the fact that my job offers me the opportunity to work in a multi-cultural environment, while still

spending my tea breaks with friends I have studied with since school!

Can you say anything about the future job prospects in your industry?

Seagate offers opportunities across a wide range of disciplines, from product design, process engineering, modelling to computing. Given the high tech nature of the industry, it is absolutely critical for success that we continue to attract engineers who demonstrate a logical and methodical approach to problem solving, who are strong communicators and who are willing to work on challenging problems at the forefront of development on a global scale.

Would you recommend product design engineering to other young people?

If a young person is interested in solving problems, enjoys a challenge and would like to feel that their efforts are making a tangible impact in a global market, then yes, I would recommend product design.

How do you balance your career with your personal life?

As well as being an extremely busy product design manager, I'm also the mother of four young children aged 5, 9, 10 and 12. The fact that Seagate is a family-friendly employer helps me maintain a good work-life balance—for example, if necessary, I can work from home, or work flexible hours. My advice to other working mothers is to be as organised as possible—from good childcare to establishing and sticking to a structured routine. And Skype is a great invention when travelling, as it enables me to keep in touch with my family. ◆

Technology

Careers





Introduction

Information technology and Food Technology are two STEM industries that are not dealt with elsewhere in this booklet. They are already hugely important for the Northern Ireland economy and are growing in importance. The shortage of skilled personnel in both the Food and IT industries has meant that the Department for Employment and Learning has funded conversion courses for people who have qualified in other disciplines to enable them to work in these areas. Whilst some of the people profiled in this section have studied qualifications in IT or Food Technology, others have attended those conversion courses and obtained employment within the STEM companies. One of these profiles also demonstrates that there is a demand for IT skills in non-IT businesses.



Information Technology

Eamon McMahon

Infrastructure Services
Engineer, Kainos



Can you describe a typical day?

I am an Infrastructure Services Engineer, working at Kainos in Belfast. Kainos has been running for more than 26 years and has offices across the UK, Ireland and Poland. We provide solutions to clients all across the Public, Healthcare and Financial Services Sector.

My role involves designing and implementing the infrastructure components required for Kainos projects.

I am the primary Infrastructure Services Engineer for Electronic Document and Records Management projects within our Support Services Unit. This requires a fair amount of travel to client offices throughout the UK, performing application upgrades/installs, or meeting customers to discuss the future plans and requirements for their EDRM solutions.

As an Infrastructure Services Engineer your role is certainly varied, which offers great opportunities to be involved with many different projects and clients from various business sectors and get hands-on with the latest technologies.

Would you say that an Infrastructure Services Engineer role represents a good career?

It is a great career for anyone interested in IT hardware, networks and the latest technology. An Infrastructure Services Engineer role is never dull! There are opportunities to travel and indeed, we have engineers who have worked in places from London, to Canada and even Nigeria.

Can you say anything about the future job prospects in your industry?

Computer system technologies are continuously changing. Whether a system is implemented on premises, in the cloud, or as a hybrid solution, an Infrastructure Services Engineer provides the technical expertise to ensure it is implemented securely, on time and within budget to the customers' satisfaction. Businesses are more dependent on their computer systems than ever before, requiring their systems to run around the clock. This creates a bigger demand for IT engineers.

What has been your educational route to this post?

I was at Rathmore Grammar School from 1995 to 2002 and did A-Levels: Maths, Physics and Business Studies. I then studied Computer Science (BEng Hons) at Queen's University Belfast from 2002 to-2006. However, in IT your learning never stops! I have done a number of courses to develop my technical and soft-skills, for example, Microsoft Certified Systems Engineer (MCSE), Prince2 (project management), ITIL (IT Service management) and ILM (Management).

Which professional institute do you belong to and what benefits does that offer you?

I am a member of the British Computer Society. It organises local events to share ideas and offer advice about IT topics. A lot of the events run are open to members and non-members alike and are really are worth checking out for anyone interested in a career in IT. Talks vary from Curriculum Vitae (CV) and interview advice to talks on the latest IT trends like Cloud Computing, or Big Data.

They also run social events throughout the year, with 7-a-side football tournament and an annual golf outing which are always great craic.

Who or what most influenced your choice of degree/career?

The biggest influence for me when choosing my career was probably my

dad. He studied Computer Science at Queen's and runs his own successful IT firm, Nitec Solutions. I have always been around computers from a very early age, my first computer being a Dragon32, which ran programs from cassettes! I have always had a keen interest in how computers work and like anyone involved in IT, I spent many hours fixing the PCs and laptops of friends and family. This early exposure has grown into my career as an Infrastructure Services Engineer at Kainos. In the future I plan to move my career into client management, managing the client relationship across projects, as well as resourcing, finance and reporting. It is certainly a change in direction from an Infrastructure Services Engineer role, but it goes to prove a career in IT doesn't have to be linear, or follow a strict pathway; there are many career opportunities available through a wide range of roles.

Would you recommend your career to young people?

Definitely! My career has developed out of my early interest in IT and it certainly helps make for a great career when you really enjoy what you do. The IT industry is growing strongly and with everyday life becoming more and more dependent on IT, I can't see that slowing down anytime soon! It is a great career that can offer many different career paths and many opportunities to travel and be involved in new and exciting technologies. If you have a strong work ethic, can-do attitude and a real desire to continually learn new and exciting things, then this is definitely the right career to be involved in. ◆

Information Technology

Angela Woods

Principal Consultant, Fujitsu



Can you describe a typical working day?

I suppose what is most interesting about my current role is that there is no typical day.

I am currently working in a Pre-Sales team in the Oracle Practice within the leading Japanese IT company, Fujitsu, with particular focus on providing customers with ongoing support service.

Typically, that will require liaising with the technical and functional design teams to understand the various elements included in the customer solution, then designing and costing the support service required for the bid. At any point, there could be three to four bids at various stages of the process and each bid will be addressing different client needs and sectors.

What has been your educational route to this post?

I've taken a circuitous route to this current role. Following completion of my degree in Physics and Applied

Mathematics, I completed my Chartered Accountancy qualification with a leading accountancy firm in Belfast. I followed the typical pattern of working in the audit department, before taking a secondment to the Health Service, where I was involved in the implementation of new systems and processes, as the various Trusts were created. This secondment really sparked an interest in accountancy systems.

From there, I moved to European Car Components, a manufacturing company, where I worked as the management accountant, responsible for the production of the monthly accounts. Whilst there, we undertook the replacement of the various accountancy systems into the Oracle eBusiness Suite.

The implementation process inspired me to move to Fujitsu and continue work on implementation of the Oracle eBusiness Suite.

I've now been with Fujitsu for over 16 years and during this time, I have worked in various roles. From initial implementation work, upgrades, support, managing the support team and now in a pre-sales function.

Your route to this post has been unusual, can you tell me has your training and work developed the same core skills?

I suppose it may appear unusual, but when I look around the team there are many of us who have backgrounds in either broader science or accountancy, who are now involved in IT in various roles, from service delivery, consultancy and the more technical roles.

Regardless of route into the job, there are some common skills, including being analytical and good at problem solving. Another common thing is that we have all been able to use our previous experiences in other avenues to the advantage of this job.

What do you really like about your job?

In the current role, the best bit of course is winning a particular bid you may have been working on! But the real attraction is the variety and the fact that I work for a company which has innovation at its core means there is always something new to learn and apply each day.

Can you say anything about the future job prospects in IT?

Fujitsu's global reach and vision for a Human Centric Intelligent Society where ICT has the power to transform business and society for everyone's benefit suggests the possibilities are infinite in this space.

The huge advances in IT in the past decade mean organisations can now use IT on an unprecedented scale. Due to the way that technology has evolved and the scale the digital world can handle, we now have the means to do extraordinary things — to manage city infrastructures and traffic flow, to manage our energy resources, to manage water and agriculture production. There is no industry which does not rely on ICT in some way.

The recent technology megatrends of cloud, mobility, big data and the 'Internet of Things' together present transformational opportunities for NI and our wider society. The implications are so far-reaching, meaning it is a very exciting time to be involved in the industry. ◆

Information Technology

Sheree Atcheson

Product Analyst, SR Labs and UK
Expansion Director of Women Who Code



Tell us a little about yourself

I'm Sheree Atcheson. I'm a Product Analyst at SR Labs and alongside this, I am the UK Expansion Director of Women Who Code (WWCode).

Women Who Code is a worldwide San Franciscan born organisation with over 30,000 members worldwide. My aim of founding WWCode in the UK is to eradicate the gender bias in the IT industry, through free monthly hack nights, tech talks and career trainings.

What does this involve on a typical day?

In my everyday life, I have a lot of different roles. As a Product Analyst, I work in Client Services, supporting the feed handler products that SR Labs provide and answering any questions that the customer might have. And as the UK Expansion Director of Women Who Code, I am constantly networking, speaking at conferences, organising events and meeting industry leaders who are interested in helping WWCode reach its highest potential in the UK.

My main goal is to strengthen all of our UK branches and ensure they are able to work to the best of their ability.

How do you see your role making a difference in today's computer industry?

I find my job hugely satisfying, in that I am actively working every day to bring more females into IT. There has only been a 3% rise of women in tech in the past 20 years and this is something I want to fight against. It's a well-known fact that in order for any software house to flourish, it needs a diverse range of perspectives on any given problem. So it will only benefit the industry and the women involved to have a place like Women Who Code, which allows them to grow their confidence, nurture their digital skills and prepare them for any IT related job. I'm putting in this work now, so that the future generation of women will know that there is, and will continue to be, a place for them in technology.

Did you always have an interest in computing?

I have always had a huge interest in programming, even when I was younger. This led me to choose A-Level Computing and eventually, Computer Science at Queen's University, Belfast (from where I graduated in 2013).

Who or what influenced you when choosing your career path?

My A-Level computing teacher influenced me the most with my career path. I always knew I wanted to do something in technology, but didn't know exactly what until I did A-Level Computing.

His passion and excitement for Computing (even after teaching the course for over 15 years) was infectious. And after a few short weeks, I knew I wanted to be a software engineer. Even to this day he inspires me. Having talked to current teachers at my secondary school, they have told me that he is still as passionate as he was when he taught me six years ago. These are the kind of people that drive me, the people that never forget why they got into tech in the first place and continue to strive to bring something awesome to the next generation.

What do you love most about your job?

I love my job because what you put in is what you get out. I have put a lot of effort into starting and expanding Women

Who Code in the UK and because of that, I have had some really amazing things come my way. In January 2014, Women Who Code Belfast was listed as one of the Leading Belfast Start Ups by the Guardian. I have also appeared in Wired, Computer Weekly and Marie Claire and spoken at conferences/panels such as techUK, Inspirefest and many more. Being a part of WWCode has brought a great sense of fulfilment to me and I look forward to taking it forward with even more passion than the previous two years.

Would you recommend Software Engineering as a career?

I would wholly recommend software engineering to the younger generation. The point needs to be made that there are hundreds of different jobs in IT, not just coding or "being stuck behind a computer". I am a Product Analyst (with three years behind me as a Software Engineer), but I am also now an Expansion Director of an organisation which benefits thousands of people. There's no limit to what you can do. Focus on what you want to do, and go for it. Always remember that regardless of who you are, in order to be in technology, you do not need to be a man, a "geek" or a "nerd". All you need is to be interested. ◆

Information Technology

Darren Taggart

Performance Test Consultant,
SQS, Belfast



What does your job entail?

The SQS Group (SQS) is the world's leading specialist in software quality. SQS' position and expertise as the market leader are the result of over 30 years of successful consultancy. We offer a range of software testing services throughout the software development lifecycle to include, but not limited, to Quality and Risk management, test management, Function and non-functional testing, On-demand testing and development quality.

As a performance testing specialist, no two days are ever the same. I have had the opportunity to work with a variety of testing tools and methodologies across many industries such as legal, insurance, retail and utilities. Currently, I am working for a Government body, testing their online application.

What has been your educational/professional route to this post?

I graduated from University of Ulster, Jordanstown in 2008, with a BSc Hons in Building Surveying. After a period of travel, I returned home and found that due to the economic downturn there were very few openings within the construction industry. I then trained as a retail manager and worked in this field for many years. However, I had always had an interest in IT and enrolled on the Software Testers Academy, funded by the Department for Employment and Learning, which included a placement with an IT firm for non-IT graduates. My placement was with SQS where, on completion, I was extremely fortunate to be offered a position in a top consultancy firm, where strong emphasis on personal development is a core value.

What do you like about your job?

I love the variety. During the past year, following an induction period of three weeks in South Africa, I have been involved in numerous projects in various capacities, which have allowed me to work not only in Belfast, but also in London and Dublin. I have gained a vast amount of experience and knowledge. SQS have an excellent extended graduate programme, which facilitated the development of my skills. As part of this scheme, I have completed a development course in Java and become a performance testing specialist, as well as attending several company events, where I have networked extensively with clients and colleagues and have been actively involved with the company's charity, the NSPCC.

How would you rate the future job prospects in your industry?

The job prospects are fantastic. The IT sector is constantly growing and SQS has an impressive career development process. Software quality is increasingly becoming a key factor when it comes to competitiveness in the marketplace. Reliable and flexible systems with low fixed costs have become an absolute "must". Major challenges are constantly being created by the ever-changing world of business and growing pressures, in terms of costs, time and quality.

Would you recommend Software Testing to other young people?

Absolutely, if a young person has an interest in IT, has a logical way of thinking, likes to be challenged, have the opportunity to travel, meet new people, develop not only personally, but also professionally, then this is a career for them. ◆

Information Technology

Clare Flynn

Project Manager, Liberty IT

I am a Project Manager working in Liberty IT. Liberty IT is a professional IT company, based in Belfast. Our parent company, Liberty Mutual Insurance, is one of the world's largest property and casualty insurance companies. While the majority of their business is in the US, a very significant portion is also worldwide.

My role involves managing a team of software engineers, working on large scale software development projects using cutting edge technologies. My day-to-day activities can range quite significantly, depending on the stage of the project. This can be anything from meeting with key stakeholders to helping identify project objectives, to project planning and budgeting activities. I currently manage a project which is focussed on enhancing the user interface of a commercial insurance application to improve user experience.

Is it 9-5?

The average working day lasts eight hours, however there are times when there is a requirement to work extra hours to meet project commitments, or to attend customer meetings. This is balanced out by the work life balance initiatives that Liberty IT offer, for example, I can work from home if I need to, or leave for an hour in the afternoon to attend an appointment. I also have the option of starting work at any time between 8am and 10am.

How did you get into this line of work?

I have had a passion for technology since receiving my first computer, a ZX Spectrum, at the age of seven. Learning the basics of programming while studying



computer science at A-Level confirmed that this was the profession for me. I was further inspired when a group of software engineers from a local company called Apion came to my school to talk about what it was like to work as a software professional. When I successfully secured one of two places in their scholarship scheme, which promised to fund me through University, the die was well and truly cast.

Can you outline your career to date?

I gained industrial software engineering experience at a very early stage in my career, due to being awarded the Apion Scholarship while studying for my A-Levels. The scholarship involved a post A-level gap year spent in full time employment with Apion and subsequent summer placements while at university. I graduated from the University of Ulster in 2003 and took a graduate position with Liberty IT. My first eight years in Liberty IT were spent working as a software developer. I have held various technical roles from associate software engineer right through to senior software engineer. The work over the years has been wide and varied and I have had the opportunity to work on various projects with exposure to a variety of technologies. I have also travelled to numerous customer sites in the U.S, including Boston, Seattle and San Diego. From a career perspective, I have always been interested in IT project management. I gained leadership and management experience while acting as

tech lead on a number of projects in Liberty IT and this has aided me in moving into project management in the past three years.

Tell us about your qualifications/training.

I went to St Dominic's, Belfast from 1992 to 1999 and studied A-levels in Computer Science, Biology and Mathematics. I then attended the University of Ulster (Jordanstown) from 2000 to 2003 and obtained a First Class Honours B(Eng) in Software Engineering.

Over the years in Liberty IT I have had on the job training and attended numerous training courses and conferences to develop both my technical and soft skills.

What qualities are required for your job - personal and professional?

The software engineering industry is an exciting and dynamic industry, where the qualities required to be successful in any role include not only technical ability, but equally important are strong communication skills and the ability to work both independently and as part of a team. In my current role, it is important to have excellent leadership, organisational and customer relationship management skills.

What is the best advice you ever received?

Create your own destiny. ◆

Information Technology

Barry McNeill

IT Systems Administrator,
Kilwaughter Chemical Company



Can you describe a typical working day?

An average day in the life of a system administrator involves balancing a number of routine maintenance tasks with diagnosing problems reported by network users.

The system administrator will update systems, applications and maintain databases on a regular basis. I spend some time responding to e-mails or calls from network users looking for technical assistance, for a range of issues from accessing the internet to the company database. Often I find myself visiting the network user's workstation to diagnose the problem and determine if the cause is an issue with the database, an application or the network. When new employees join the company, the system administrator is responsible for assigning network and database privileges to the individual, setting up their login information and delivering training on user best practice.

I am responsible for setting up the database back-ups at the end of the working day; this is a safety measure in the event of server or hard drive failure, the data can be restored and it doesn't interrupt the company's operations.

Would you say that IT represents a good career?

Systems Administrator is a great career to get into, as you face a different challenge every day. As technologies develop, so does my knowledge, so you find yourself constantly adapting and learning new things.

How does IT make the world a better place?

IT is always operating behind the scenes in every department, ensuring Kilwaughter deliver the high level of service they are renowned for in the marketplace. Without a well maintained IT system, the company would not be able to manufacture efficiently.

What has been your educational/professional route to this post?

My educational route to this post started with a BTEC IT Practitioners course at Northern Regional College Newtownabbey. This course helped me to get into University of Ulster, Jordanstown to complete an Honours degree in Computer Science.

What do you really like about your job?

The best thing about being a Systems Administrator is the variety of projects. The role carries a greater level of responsibility and the experiences I have been exposed to at Kilwaughter have been second to none. On a day when you solve a major system issue, or diagnose a system fault, you feel a sense of achievement with a job well done.

Can you say anything about the future job prospects in your industry?

The IT industry is one of the biggest and fastest growing industries. Northern Ireland is attracting business from the major IT organisations, due to its high calibre of IT graduates. Many businesses like Kilwaughter are willing to invest in their IT resources, recognising that efficient IT systems can create a competitive edge in the marketplace.

Would you recommend IT to young people starting out on their career?

I would definitely recommend IT to young people that are starting out on their career, as Northern Ireland has one of the most thriving IT industries. ◆

Food Technology

Sheena O'Hanlon

Senior Development Technologist,
Moy Park Ltd.



Describe your job

As a Senior Development Technologist for Moy Park, I develop new products in line with the latest food trends for major retailers. I manage the process from the initial concept, to working with the development team and our chefs on flavours and ingredients, as well as considering packaging, costs and profit margins. I work on the Agri-Fresh Account, which takes in new product development for both chicken and turkey – currently we are working on products for Christmas.

What has been your educational route to this post?

I studied A-level Home Economics, which was one of my favourite subjects and then did a degree in Consumer Studies at the University of Ulster. As part of my degree, I completed a placement year at Dunbia, where I got my first taste of food development and also earned a Diploma in Industrial Studies. Following graduation, I secured a job with Bakkavor, which is an Icelandic

company, where I worked for four years on the salads' account. I then got my current post with Moy Park.

Did you have a role model in mind when you chose your degree? Or who or what most influenced your choice of degree/career?

First and foremost, I'm a foodie at heart and have always had an interest in food. In fact, I originally wanted to become a chef - however, the reality of anti-social hours and working in a hot kitchen swiftly changed my mind! I then began to think about how food ends up on our supermarket shelves, which triggered an interest in food development. Another great inspiration for me was one of my lecturers at the University of Ulster – Dessie Hill, he was a fantastic speaker. His passion for food was contagious and he really inspired me to follow my current career path.

What do you really like about your job?

One of the main things I love about my job is the opportunity to be creative. I have my finger on the pulse of current food trends and have to be ahead of the curve in product development. I take my inspiration from chefs and restaurants and see how I can apply this to new products. In essence, I endeavour to make Moy Park the trend-setter! I also love seeing the end result – it's fantastic when friends or family see something on supermarket shelves which I've worked on, or I see an ad on TV – it really is the most satisfying feeling.

Can you say anything about the future job prospects in your industry?

I believe there is a great future for the food and drink industry in Northern Ireland and excellent opportunities exist for young people to develop skills and careers in the sector. Moy Park is a fantastic local employer and there are a range of opportunities for young graduates with the right attitude and an interest in the industry. Many of my colleagues started their careers at Moy Park and have grown with the company, developing their skills to progress within the business.

Would you recommend food development to other young people?

Food development is an exciting and creative industry with a host of opportunities. If you enjoy a fast-paced, but most of all interesting career, then food development is for you! ◆

Food Technology

Mairead McGurk

Brand Product Development Manager,
Moy Park Ltd



Can you describe a typical working day?

No two days are ever the same for Moy Park's Product Development team. In a typical day, I may travel to another site to carry out trial work on a new concept, work on new products in the development kitchen with our team of chefs, or take part in a 'Food Safari' day. I really enjoy the variety my job offers - there is never a dull moment - and we are always working on something new and exciting to bring to the market.

What has been your educational route to this post?

I graduated from Queen's University Belfast in 2007 with a BA Hons in Politics. I really wanted to get into the world of work after I graduated and I had a keen interest in food. I discovered the Parity 'Premier Plus' Programme, funded by the Department for Employment and Learning, which gave non-food graduates an avenue into the food industry and I didn't hesitate to apply. This was the most influential course I completed and kick-started my

career in the food industry. It truly gave me an insight into the food sector and the opportunities that might be open to me if I worked hard and remained dedicated. Loughry College CAFRE was key in the educational side of the programme and gave me the knowledge I needed to succeed.

How does your work as a Product Development Manager make the world a better place?

As a Product Development Manager, we take the hard work out of grocery shopping for the consumer. By completing the market research and development work, we provide shoppers with the added value and convenience they want from products, which means shoppers don't have to buy ingredients they would not normally purchase, to make the meal from scratch. As we are all getting busier with less time in the evenings to cook, it is essential that there are healthy, tasty options for the consumer on the supermarket shelves.

What do you really like about your job?

The variety, the team of colleagues I work with and of course, all the amazing food I get to taste!

Can you say something about your perception of future prospects in the agri-food industry?

The future is bright in product development - we are constantly looking at new food trends, technologies and process improvements. Constant evolution means we are always busy.

How do balance your career with your personal life?

I really do try to balance work and my personal life - I am a keen cyclist so this helps me to relax!

Would you recommend your area of work to other young people?

Most definitely! Until I discovered food manufacturing as a career path, I was unaware of the opportunities that existed within the sector. I did not take the most traditional pathway into the food industry, but through time and hard work I managed to forge a career that I am happy with and can safely say is rewarding and challenging. ◆

Food Technology

Joanne Elliott

Technical Manager,
Mash Direct



Describe your typical working day.

As Technical Manager at Mash Direct, no two days are ever the same, so it is difficult to describe a typical working day, although this variety is what I enjoy most about my role. On average, I spend approximately 70% of my time on the factory floor, completing checks to ensure everything is up to standard in terms of product quality and safety, whilst making sure procedures are being adhered to. At Mash Direct, we have had a BRC A+ rating for food safety for several years, which we are very proud of and these checks play an integral role in maintaining it. I also deal with customer queries, assist with New Product Development Projects and am continuously conducting tastings, sampling products and trialling new recipes. There is daily interaction with like minded customers and suppliers and we are always aiming to improve on and create new customer specifications and expectations.

What has been your career path to this post?

My career path has not been straightforward, as I actually studied a joint honours in English and Spanish at Queen's University. However, I embarked on a Fast Track Post-Graduate Programme with Parity Training in Belfast, funded by the Department for Employment and Learning, which was designed to introduce non-science/food technology students into the food industry. I would certainly recommend such a Programme, as it enabled me to undertake a placement as a Quality Assistant, an area of food manufacture I particularly enjoyed, which then led to me being offered my first role as a Quality Assistant, after just three months placement. I later took on a Quality Manager post in a high risk environment and then moved into a Quality Manager role in fresh produce, before joining

Mash Direct as Technical Manager in January of this year. I have been very fortunate to work for companies and, in particular, Mash Direct that offer full support behind their Technical Team. They have always encouraged my development and provided for the needs of the team.

What would you say about the future job prospects in your industry?

The food and drink industry is one of Northern Ireland's biggest successes, as vibrant companies like Mash Direct continue to hit the headlines with positive news stories of expansion and growth. This opens up a host of exciting career opportunities for young people in all aspects of the industry. In particular, there are always jobs and career opportunities within Technical Departments, which were once described to me as 'the heartbeat of the business'. Mash Direct is a fantastic local employer and as the business continues to evolve, new roles are developing all the time for enthusiastic, forward thinking individuals.

What do you really like about your job?

I love the fact that each day at Mash Direct is totally different and the job itself is very diverse. I am constantly learning new things and I have had lots of opportunities for personal development through training. I also particularly enjoy working in a dedicated team where everyone is encouraged to bring forward new ideas for product development and production methods. It is this team work which has contributed to Mash Direct's award winning success, recently securing a further three Great Taste Awards to add to our product portfolio, which is hugely rewarding for all of us. There's never a dull moment working in this fast paced environment, as ultimately we provide the end consumer with confidence in the quality and safety of the product they are buying.

Would you recommend food technology to young people starting out on their career?

Definitely! ◆

Engineering

Careers





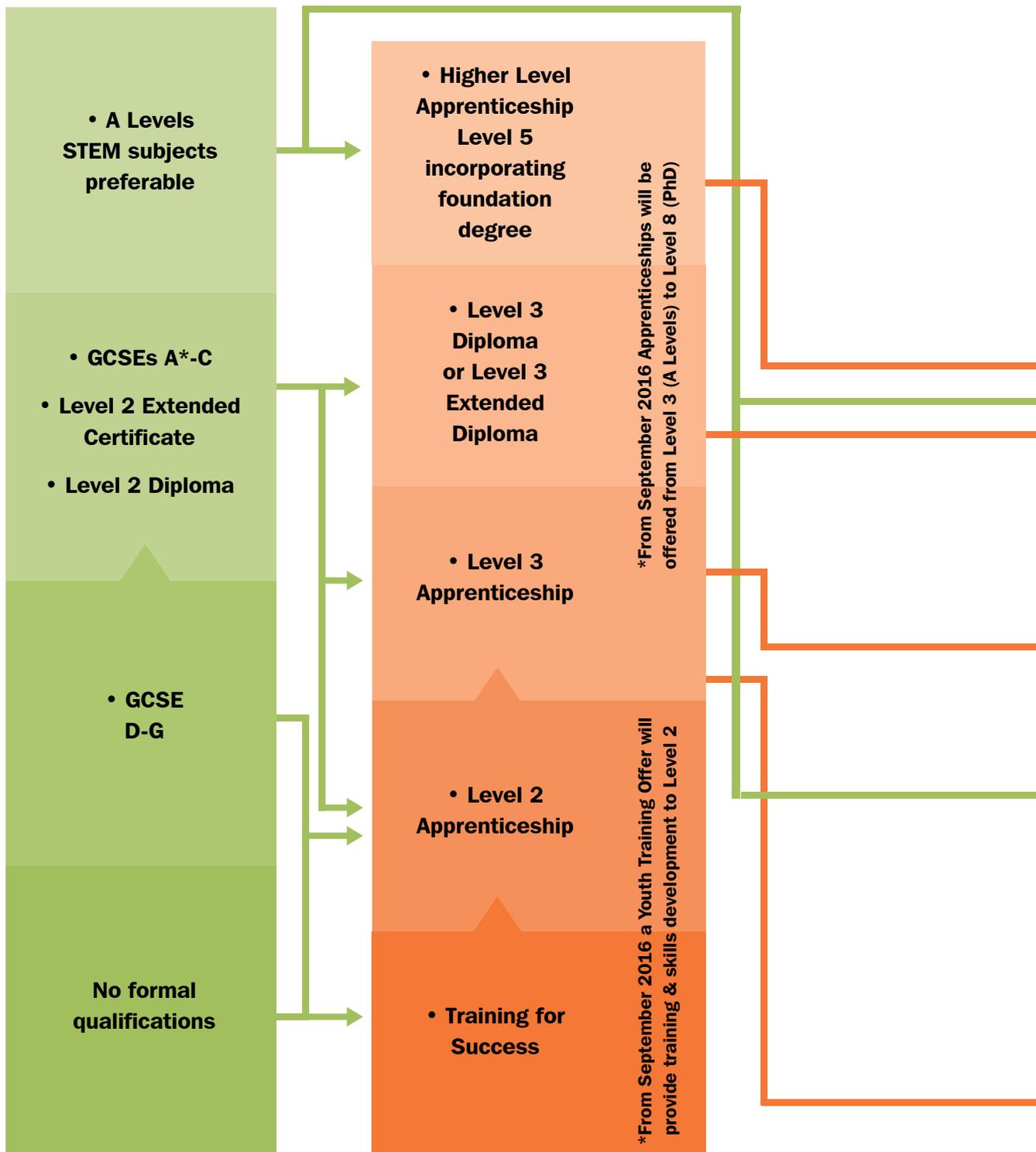
Introduction

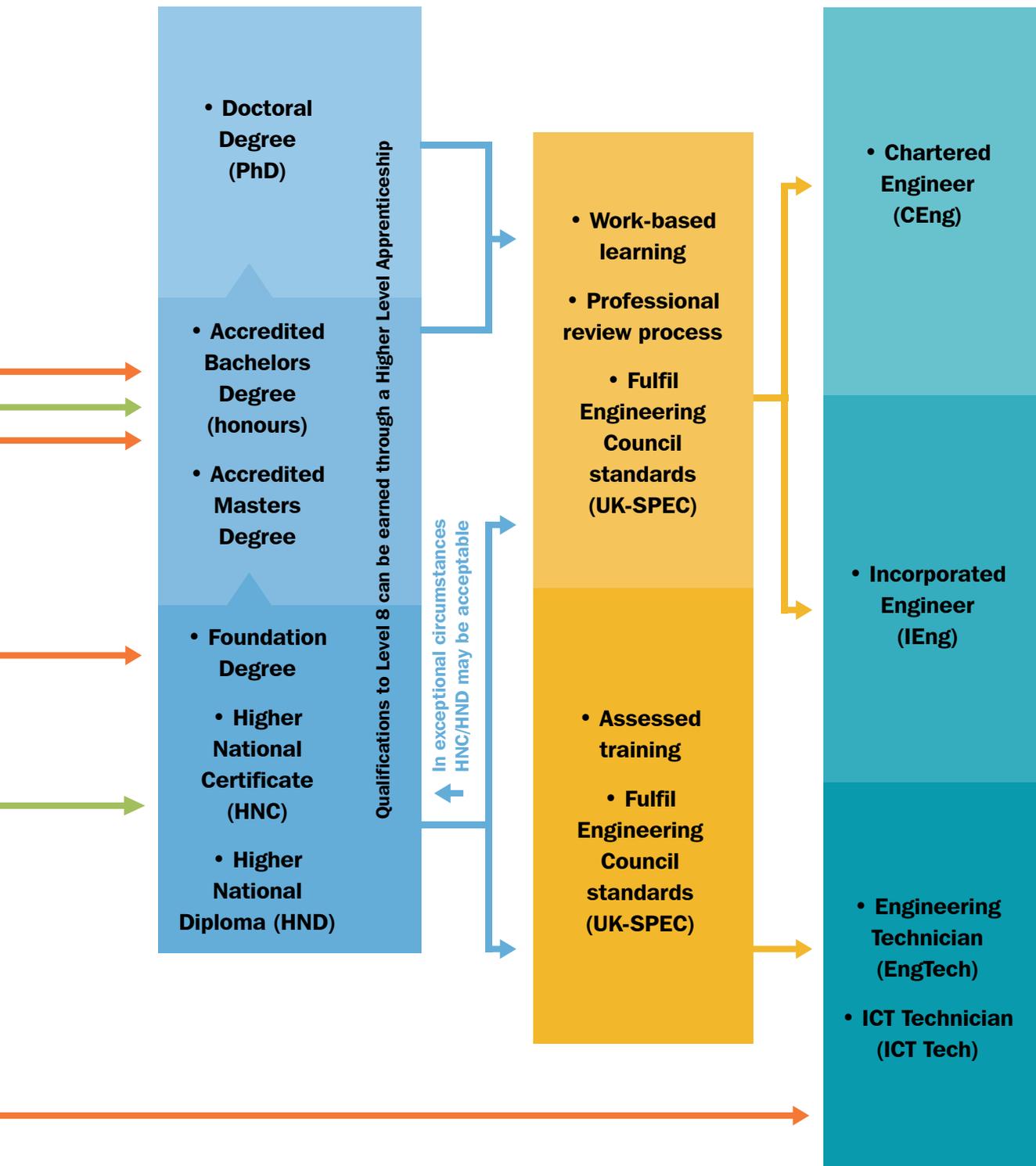
Sometimes it is difficult to explain to a young person what an engineer does, but put simply, an engineer is someone who has specific scientific training and who designs, builds, improves, or maintains complicated products, machines, systems, or structures. Engineers will often say that their chief skill is solving problems in their particular field. But just how many fields of engineering are there? Some sources list up to 200 types of engineering, however, the main types of engineering covered in the profiles in this booklet are aerospace, chemical, civil, electronic and electrical engineering and mechanical engineering.

There are many ways into the engineering professions as the diagram on the next page illustrates. These include further and higher education, work experience and apprenticeships at different levels.

Engineers are employed in many types of industry in Northern Ireland, including the aerospace, construction, electricity generation and networking, food processing and manufacturing businesses. One of the civil engineers featured here, Catherine O'Neill, demonstrates that engineering can be a route to building your own business. Indeed a recent report in the Telegraph newspaper¹⁷ showed that of the 100 wealthiest people in the world, 22% studied engineering at university.

Qualification Pathways to Career Success





Aerospace Engineers

Brendan Carey

Aerospace (Stress) Engineer, Nacelle Systems Consultancy Ltd, Belfast



Can you explain first what a nacelle is?

A nacelle is a housing separate from an aircraft fuselage, that holds engines, fuel, or equipment on the aircraft. In Nacelle Systems Consultancy (NSC), we design engine nacelles.

Can you describe a typical day?

A typical day involves both short and long-term planning of the tasks required to achieve certification of the systems on aircraft engines. Good planning skills are essential, as a typical engine nacelle programme lasts about five years and will encompass design, analysis, testing and certification. My main role at the moment is to manage the integration between component suppliers, the airframe manufacturer and the aircraft engine manufacturer. It involves dealing with complex information, customer-supplier relationships and ensuring that the high safety standards required by the certification authorities are maintained. Aircraft programmes tend to involve global co-operation and this one is no exception. Coordinating all of this requires excellent communication skills and I am regularly involved in on-line conference calls with

suppliers, the engine manufacturer and the air-framer. I am also responsible for ensuring the structural integrity of the engine components and regularly review designs and work closely with our design engineers to ensure that parts are robust enough for many years of service on the aircraft.

Is aerospace engineering a good career?

A career in a growing business like NSC has an abundance of opportunities and responsibilities available. If you are prepared to seek them out, then it is highly rewarding. The business is committed to supporting its staff to achieve their goals through excellent training and development and it isn't restricted by the corporate structure typically found in large businesses.

How does aerospace engineering make the world a better place?

Being able to travel safely to all corners of the globe in a few hours is something we all take for granted, however aerospace engineers are working hard every day to ensure that remains the reality. NSC

forms a small part of that, by working on the latest fuel efficient aircraft engines and ensuring that the highest standards of flight safety are maintained. NSC is committed to the sustainable growth of the business, through developing an excellent team of people who can face up to the challenges of the industry.

What has been your educational route to this post?

I graduated with a Masters in Aerospace Engineering from Queen's University Belfast in 2009.

Which professional institute do you belong to and what benefits does that offer you?

I am currently working towards becoming a Chartered Engineer with the Institute of Mechanical Engineers (IMechE). I think it demonstrates a commitment to achieving and raising engineering skill levels within the business to our customers. This is particularly important for a young business like NSC, to compete successfully and become established within the aerospace industry, which is strongly focused on achieving high standards.

Did you have a role model in mind when you chose your degree?

My Dad is an engineer, so I think I have inherited his passion for building things and understanding how machines work. When it came to choosing a career, engineering seemed to be the obvious choice. There are many people at the top of their industries whom I admire.

People like James Dyson, who have dogged persistence and attention to detail, have changed the world through their talent for innovation. However, they know better than most people that true success is built over time and cannot be achieved without the backing of an excellent team of people.

What do you really like about your job?

The most rewarding aspect of my job is seeing and being part of what can be achieved whenever a team of skilled people pull together to achieve something much bigger than what anyone can achieve on their own.

Can you say anything about the future job prospects in your industry?

Since I graduated, I have witnessed the local aerospace industry grow immensely with unprecedented levels of investment in new factories and Research and Development. With that investment, the demand for engineers is very high and I don't see why that will change. I think Northern Ireland is being recognised globally as a centre of excellence in aerospace due to our engineering skills and innovation; the future looks bright.

Would you recommend aerospace engineering to other young people?

Now is a fantastic time to join a company like NSC. It is a growing business within an industry which is forecast to grow over the next 20 years, due to increase in the global demand for new aircraft. That means that there will be a huge amount of opportunities available for any young person joining the company in the near future. With the opportunities also come the rewards! ♦

Aerospace Engineers

Suzanne Breslin

Aerospace, Stress Engineer,
Bombardier Belfast



Can you describe a typical working day?

I am employed by Bombardier as a Senior Stress Engineer and I work in the Damage Tolerance Group within the Stress Office. My working day begins with checking and answering any technical queries I have received, followed by prioritising and planning my tasks for the day. I gather and request any information that I am likely to need, make contact with suppliers to ensure nothing is holding them back and discuss plans and issues with my team. A lot of our suppliers work in different time zones and so a certain level of time planning is essential: for example, we work with people in Montreal, who are five hours behind us and in Bangalore in India, who are four and a half hours ahead. In addition, there can be language and cultural differences to negotiate. Throughout the day, I may be required to attend meetings, have telephone conferences and participate in various technical discussions.

Stress engineers are primarily employed to ensure the structure of an aircraft is as light as possible, whilst still being able to carry the structural design loads and satisfy the in-service durability and maintenance requirements of the aircraft. The Stress Department is responsible for the structural integrity of an aeroplane, ensuring it complies with the standards set by the regulatory authorities. The principal means of compliance include different analyses and testing, such as static analysis, fatigue analysis, and durability and damage tolerance analysis, along with full scale and component testing. A stress engineer needs a good understanding of how a structure will react and behave under particular conditions, material properties and characteristics and fabrication and assembly methods.

What has been your educational route to this post?

I studied Maths, Physics and Chemistry for A level and then I completed a degree in Aeronautical Engineering at Queen's University, Belfast, graduating in 1988.

What do you really like about your job?

My job is never boring; it is a constant challenge to keep up with advancing analytical techniques. Although the basic principles of structural engineering remain unchanged, the means by which we complete our analysis and the tools which we use are constantly changing and that means personal development is a permanent requirement. There is an increasing need to work with a range of global suppliers and so for some employees there are a lot of opportunities to travel.

Can you say something about your perception of future prospects for the aerospace industry/ aerospace engineers?

I think there are definitely positive prospects for the aerospace engineers of the future, both locally in Northern Ireland and in the wider UK and global markets. It is estimated there is a global requirement for over 60,000 new civil aircraft over the next 20 years. So the demand for design and manufacture of aerospace components should

continue to be strong, as manufacturers recognise the need for increased investment in research and development and customers seek more cost efficient aircraft, with reduced environmental footprints, to meet exacting regulatory standards.

How do you balance your career with your personal life?

Bombardier has flexible working arrangements available for employees, like me, who have caring responsibilities, so I have mostly been able to achieve a work/life balance that suits my family needs and is also satisfactory to my employer.

Would you recommend your area of work to young people?

Yes, I would. I have always enjoyed working in Bombardier and have found my career challenging and interesting. Some aircraft programmes have been more demanding than others, but that adds to the variety! And I have been fortunate enough to work with a group of people who have always behaved professionally, treated each other with respect and behaved with complete integrity. ◆

Chemical Engineers

Chris Taylor

Process engineer, Kilwaughter Chemical, Larne



What has been your educational/professional route to this post?

From an early age and even throughout school, my Technology and Science teacher told me that I should study Engineering. At that point I wanted to go into Chemistry. While studying for my A-levels, I knew that I wanted to go down the Chemistry route. I applied to do Chemistry at Queen's University. During my first semester, I completed modules in Chemistry, Chemical Engineering and Maths. It was at this stage I switched my career focus to Chemical Engineering, as I found the module really interesting.

Would you say that Chemical Engineering represents a good career?

Absolutely! Chemical Engineering needs a good solid background in chemistry to understand the nature of the chemical process and the movement of materials. After graduating, I began looking for work opportunities and with my degree there were a variety of options open to me. The choice was initially

daunting, because I was still uncertain on my career direction. I was delighted to secure the Process Engineer opportunity at Kilwaughter Chemical Company Ltd and have found my role both challenging and rewarding. It's great being able to put my studies into practice. I am learning every day and receive coaching and mentoring from experienced engineers onsite.

Can you describe a typical working day?

I am currently working on a large project to install a major piece of operational plant onsite. With the installation phase, I am dealing with several different types of contractors, in order to progress the work to the next stage. As part of the company's three year vision, Kilwaughter is constantly investing in new plant and machinery, so there is always a new project of interest on the horizon.

My role involves project management and co-ordination skills to ensure everything is running to schedule and will meet deadlines. It's a great project to be involved with.

My days generally involve meeting with the contractors and sourcing materials. When I am not with contractors I am specifying details for new pieces of equipment and their requirements, or looking at plans to see how we can improve the process before we finalise completion times.

What do you really like about your job?

I love the diverse range of tasks in my working day. Every day is different due to the nature of my job. Working mostly on a construction project, I have to always be mindful of the projects in the pipeline and co-ordinate all the onsite contractors to ensure the operations run smoothly. So I have had a great deal of responsibility early in my career.

Would you recommend your type of engineering to young people starting out on their career?

Personally, if someone had an interest in Chemistry and working with plant, I would highly recommend they consider a degree in Chemical Engineering, as it takes parts from both sides and opens up a whole new way of thinking and looking at things. After all, it was a chemical engineer that invented the post-it note by accident! ◆

Civil Engineers

Catherine O'Neill

Civil Engineer, Managing Director,
Amelio Utilities Limited



Catherine, what do you do a living?

I am the managing Director of Amelio Utilities Limited.

I founded Amelio whilst studying at Queen's University, Belfast. I graduated from Queen's in 2012, with a first class Master's degree in Civil Engineering.

Amelio Utilities Ltd is an engineering firm with particular emphasis on Drainage and Civil Engineering. Amelio focus on giving clients the optimum service, based on solid advice and expertise - and on utilising the most advanced and innovative technology and equipment available. We provide services such as CCTV drainage inspection surveys, sewer cleansing services, drain repair utilising no dig technology, to name but a few. We currently have offices in Belfast, Dublin & Gloucester and we aim to increase our market share of the civil engineering and drainage industry throughout Ireland and the United Kingdom over the coming months/years.

What age were you when you decided to become an engineer?

At school, my strengths were in science and maths rather than in the arts. In lower sixth, I made the decision to study civil engineering at university. At that stage, engineering appeared to be an excellent career option, as there were lots of job opportunities and prospects for engineering students.

I went to Queen's University Belfast. I loved studying Civil Engineering there and this confirmed to me that engineering was the correct career path for me.

During my final years at Queen's, it was becoming more apparent that there were fewer employment opportunities in civil engineering within Ireland and the UK, owing to the economic downturn. A lot of my peers travelled to Canada, Australia and the Middle East, where it appeared there were still plenty of opportunities.

I decided, however, that I wanted to continue my career in Ireland or the UK. I had noted that there appeared to still

be opportunities within specialist areas of engineering. I decided to set up my own engineering firm offering new and better services. I was determined to place Amelio in the industry as a knowledge-based company, with a mission to be constantly innovative.

What would you say were the deciding influences in you becoming an engineer?

On the basis of my subject choices, my parents were keen that I should study accountancy.

However, one thing which had stuck in my mind was watching a programme, some years earlier, about business in Northern Ireland. Orla Corr, one of the Directors of the McAvoy group, was featured. I remember being impressed that she appeared to be a very strong woman, working in what would have been perceived as a male dominated environment. It made me think that perhaps I could also work within engineering. I saw Orla Corr as a role model; someone that I could emulate.

How important has a good role model been for your career choices?

Orla Corr was important to me as a role model and therefore in my view, a visible female role model is absolutely essential if girls are to be encouraged to consider a career in science, technology, engineering or mathematics.

I also believe that mentors are invaluable. I have worked with and

gained greatly from the wisdom and knowledge of mentors and have also benefitted greatly from advice and guidance provided by a variety of entrepreneurs / business people, to whom I am indebted for their guidance and encouragement.

How many people do you employ now?

Amelio currently employs approximately 50 members of staff throughout the UK & Ireland. I hope that as the company grows and expands that this number will increase significantly over the coming years.

What reactions do you get from young people, in particular young women, when you tell your story?

I find that most people are very interested.

I do stress to them however, that I am still at a very early stage in the development of my company and I continue to benefit from the knowledge and experience of all the mentors introduced to me.

All in all, I am still on a very steep learning curve as I strive to become adept at the many wide and varied aspects of running a business, such as expertise in Human Resources, Finance, Marketing, working with the banks and so on.

What are your plans for the future of your company?

At the moment my 10 year plan/goal is for Amelio to become the most advanced, customer- focused and successful drainage utilities company throughout the UK and Ireland. ◆

Civil Engineers

Julie Templeton

Senior Civil Engineer & Assistant
Commercial Manager, Atkins Limited, Belfast



What has been your educational route to this post?

I studied Maths, Science and Technology at GCSE and A-Level, before taking a Masters of Engineering degree in Environmental and Civil Engineering at Queen's University, Belfast. I joined Atkins for a summer work placement and then again after graduation on their graduate programme and have been with them ever since.

Who or what most influenced your choice of degree/career?

My school teachers were very passionate about science and this led me to consider a career in science/engineering early in my school life. I chose Civil Engineering, as I was able to make a tangible difference to the world around me. I love nothing more than pointing out my work in the real world.

Would you say that Civil Engineering represents a good career?

Civil Engineering is a great career; there are an infinite number of routes to specialise within your particular

interest. This makes it possible to work easily all across the world and have the pay and benefits to go along with it. Working locally, Civil Engineering still offers good salary packages and career advancement. I have progressed from summer student to senior civil engineer with Atkins and have had the opportunity to work in various locations across the UK.

Also, given the significant projects and contracts that civil engineers work on, the ability to become a contract specialist exists. In a contracting environment, this would be as a Contracts Manager. In the consulting world, it would be in a role similar to mine as a Commercial Manager.

How does Civil Engineering make the world a better place? What do you really like about your job?

My projects aim to improve the quality of rivers and plan for flooding – this has a wider impact of improving the local environment and educating people on managing flood risk. I am immensely

proud of the river restoration I was involved in designing and constructing – fish have now been spotted using sections of the river they hadn't used in decades.

Having tangible objects and results from your job makes Civil Engineering unique; this is the thing I like best about my job. My work in Civil Engineering also satisfies my own personal interest in the environment and sustainability.

Which professional institute do you belong to and what benefits does that offer you?

Getting a degree in Civil Engineering is the first step to becoming a professional engineer with an engineering institution such as the Institution of Civil Engineers (ICE). I became an ICE student member while at university to connect to other civil engineers and attend local training events. After graduation, I changed to graduate membership and signed up to a training agreement. This agreement, between the graduate and their employer, means you agree to work together to achieve the ICE Development Objectives for professional qualifications. I continued to attend training and social events with other ICE members to help meet my objectives. I took my professional review with the ICE in 2010 and earned my Chartership. I am a full member of the Institution and considered a professionally qualified engineer.

Since gaining Chartership, I have progressed into more senior roles in my company and recently was appointed Assistant Commercial Manager for my division, Water, Ground & Environment. In this role, I review bids, assist project teams on any problems with projects and interact with the senior staff in my organisation on commercial matters for the business. I undertook the ICE's Law and Contract Procedure training and examinations to further support my new role.

Can you say anything about the future job prospects in your industry?

Civil Engineering is still very much a male-dominated industry, though more and more girls enter the profession every year. I think it is a great career and more girls should consider it. There is always need for civil engineers, especially with aging infrastructure and the recent flooding experienced across the UK. The future job prospects are strong and given the number of positions reportedly needing filled across the UK, it looks like there will be a shortage of graduates over the next few years.

Also, I have found that there are significant opportunities for career advancement in the Civil Engineering profession. The type of work and projects that you do can make you an expert in a particular area, or allow you to become a Project Manager, Commercial Manager or Business Manager. ◆

Electrical and Electronic Engineers

Joanna Barclay

Electrical Engineering Student,
Northern Ireland Electricity (NIE)

What is your role?

I was an NIE apprentice, but I'm now an electrical engineering student.

What has been your educational route to this post?

I studied for a BTEC in Electrical & Electronic Engineering in Belfast Metropolitan College and completed my HND in Electrical & Electronic Engineering. I then applied for the NIE apprenticeship programme and completed my three year apprenticeship as an overhead lines person. In 2013, my career path took a new direction when NIE offered the Apprentice to Graduate programme. I applied and was the first to be accepted onto the programme and am now a full time electrical engineering student at Queen's University.

What is the Apprentice to Graduate scheme?

The Apprentice to Graduate programme is a new scheme that opened in 2013, where NIE sponsors successful apprentices to undertake an electrical and engineering degree with Queen's University. The scheme not only helps me get a step closer to achieving my ambitions, but it is a good way for NIE to build on the practical knowledge apprentices have gained to fulfil a skills shortage.



Do you enjoy the electrical engineering course?

It's a very interesting course. At first, it was hard to adjust from a practical job where I was working outside to studying in the classroom, but I'm really enjoying the mix of academic and practical learning from the course so far.

How does electrical engineering make the world a better place?

Electrical engineering is incorporated into every bit of our modern day lives. It can be seen in everything that we use and do. From the light you switch on in the morning, to the phone you use throughout the day, to the car that gets you home at night. There is a great level of satisfaction that comes from having an idea and being able to create a design that is going to benefit people.

Who or what most influenced your choice of degree/career?

From a very young age, I have always had a keen interest in electricity. I think this interest may have come from my father working as a cable jointer on the underground cables. I have always wanted to pursue a career in the electricity industry and I believe that undertaking the degree will help me achieve this.

What do you really like about electrical engineering?

I am a very determined person who loves a challenge, therefore I love the problem solving involved within the course. I love that it's so versatile and there is so much to learn, it's very difficult to get bored.

Would you recommend this career to others?

I would highly recommend a career in engineering, as it opens up a lot of opportunities such as working in other countries. There's lots of variety and if you enjoy Science and Maths subjects, it's the perfect job field. ◆

Electrical and Electronic Engineers

Ailish McLaughlin

Small Scale Generation Planner
at Northern Ireland Electricity

A Typical Day

A day in my job can vary.

I deal with customers who are planning how renewable generators, such as wind turbines or solar panels can be connected to the grid. Landowners and homeowners producing their own electricity (and selling the excess) has become really popular over the last number of years, so my department is extremely busy.

I work with customers across Northern Ireland, planning and quoting the connection. I am mostly office-based, but part of the role also requires visits to customers' properties. When on site, I meet the customer to discuss where the renewable generator is to be located and the best way to design the layout of the NIE equipment and overhead line. Northern Ireland's electricity grid was designed many years ago, with three power stations feeding electricity out to all homes and businesses. Today, we have thousands of small generators producing electricity, which requires considerable planning – essentially we're re-engineering the grid to facilitate this.

Salary and Benefits

NIE offers a very generous salary on the graduate programme starting at £26,500 (as of 2015), increasing by approximately £2,000 each year in the two year programme.

How do you find meaning in your career?

When working for a company such as NIE, you are essentially working to ensure the people of NI are provided with electricity 24/7. This is done through day to day work, but also when storms strike, it is important to assist colleagues in order to return customer supplies as soon as possible.

Also, by working within the Small Scale Generation department, I am connecting Renewable sources of generation and this is beneficial in terms of helping the global energy crisis and ensuring NI meets the 40% of electricity generated to come from renewable resources by 2020 target.



Educational Route

I studied Maths, Physics, History and Politics for A-Level and decided to go to Queen's University and study an MEng in Electrical and Electronic Engineering. I carried out a placement in NIE between my second and third year at university and really enjoyed it, so and decided to try and get a graduate position after graduation.

Professional Institute and benefits

I am a member of the Institute of Engineering and Technology and this provides access to many engineering events and activities, which can allow you to meet new people within the sector. The IET also offers guidance to new graduate engineers, who are only starting out in their careers.

Did you have a role model and who influenced your career?

My uncle Liam was an engineer and he always encouraged me to try my hardest at whatever I chose to do. He always enjoyed speaking to me about my degree and the different topics I was studying and how this related to his job. This was good, as it allowed me to see how it applied in real life work.

My A-Level Physics teacher, Mr Laverty, encouraged me to follow a career in Electrical Engineering, because of the job opportunities available within the sector.

What do you like about your job?

In my job, I get to work with a great bunch of people, who are really helpful and never find any question too stupid!

What are the future prospects in Electricity Utilities?

With a rise in new technologies within the electricity sector, there is a huge demand for engineers, but particularly electrical engineers. Within NIE, many people are due to retire in the next few years and this leaves many vacancies that need to be filled, but there is a shortage of people studying engineering.

Would you recommend electrical engineering to young people?

I would highly recommend young students to consider studying electrical engineering, because it has given me some great opportunities so far in my life. I got to meet some great friends at university and it led to a job straight out of university, which many other degrees cannot offer in the current economic climate. The salaries on offer with many engineering companies, particularly NIE, are also substantial and this is a bonus when repaying the student loan! ◆

Electrical and Electronic Engineers

Steven Baird

Systems Design Team Leader, Sensata Technologies (formerly Schrader Electronics), Antrim



Can you give us an outline of your career to date?

On completion of my degree in 2004, I moved to Brussels, Belgium as a Graduate Wiring Harness engineer in Toyota Motor Europe's Electronics department. The Graduate programme was designed to provide a practical foundation in the famous "Toyota Way", which has made Toyota a leading vehicle manufacturer. One of the many Graduate experiences I enjoyed was working for eight weeks in the Burnastone plant's weld shop, where the Corolla and Avensis vehicles were built. This was a very hands-on experience of the Toyota production system and a lesson that the decisions I make as a Design engineer have an impact on the efficiency of a production plant. On completion of the Graduate scheme, I had earned the respect of my Japanese mentors and was asked to relocate to Nagoya, Japan to work alongside and learn from the top designers in Toyota's Technical Centre. In total, I spent two years in Belgium and two years in Japan, before returning to Northern

Ireland to join Schrader Electronics (now Sensata Technologies) in 2008. The opportunities I've had in Schrader to experience the business from many viewpoints has been fantastic. An engineering degree has provided me with the flexibility to work in Schrader's Manufacturing department, the Purchasing department's Supplier Quality team and my current role as Systems Design Team leader in the research and development department.

What was your educational route?

Limavady Grammar: GCSEs
 North West Regional College, Limavady: BTEC Engineering
 University of Ulster, Magee: BEng Electronics and Computing

Who or what most influenced your choice of degree and then your Career choice?

While studying for my GCSEs, I knew I was interested in engineering but wasn't sure which area. Instead of continuing to A-Levels, I decided to do an Engineering BTEC because I would have

the opportunity to experience various engineering disciplines. I enjoyed all the subjects and was very close to choosing an Agricultural Engineering course at Harper Adams University, but finally decided on Electronics and Computing at University of Ulster, Magee, because I was so impressed with the number of job opportunities for the course graduates at that time.

Tell us what a typical day involves?

Thanks to our global customer base a working day contains a lot of variety. I find the unique working styles and expectations of each customer very interesting. My engineering role has presented me with opportunities to travel all over the world, carrying out various test activities, presenting new concepts and troubleshooting concerns. The diversity definitely keeps the job interesting, whether it is testing a new system feature at a customer's high speed track hidden deep in a Japanese forest, or on a crowded Bangalore highway, validating a receiver location on an electric vehicle, to ensure robust system performance.

What do you really enjoy about your role?

At Schrader Electronics, I really enjoy being part of our Research and Development team's relentless drive to stay ahead of our competition and remain the leading global supplier of Tyre Pressure Monitoring Systems, by continually improving our features, products and service. There is a real satisfaction going head-to-head with competitors for new business, knowing that we have done those extra miles on the test track and put the extra thought into our designs. Being involved in the winning of multi-million pound contracts is routine for us.

What advice would you give to young people considering a career in the STEM arena?

Go for it. Following a STEM path will provide so many choices and opportunities to many different and exciting areas of work. When I chose Engineering, I never imagined that I would have had the opportunity to experience the thrill of working at the world's number one car manufacturer, Toyota and the world's number one tyre pressure monitoring company, Schrader Electronics. ◆



Mechanical

Engineers



Introduction

There are many different types of roles performed by Mechanical Engineers. In this section, we have quality and continuous improvement engineers, design engineers, project engineers and production engineers and these are only a few of the posts filled by people with mechanical engineering skills. Another important message to note is that there are different pathways into engineering. Several of the engineers featured have gone through the apprenticeship route and some others have studied for a university degree.

Mechanical Engineers

Clare Johnston

Senior Continuous Improvement Engineer, Terex, Omagh



Can you describe a typical working day?

Not really! My role comprises implementation of the Terex Business System through Continuous Improvement and the application of Lean Manufacturing Principles, which means that every day for me is highly varied.

I facilitate training sessions in Lean Principles, Problem Solving Techniques, Behavioural Based Safety and in Supervisory Skills. I organise and run team Kaizen events, as well as coaching other team members.

Spending time on the shop floor increases my awareness of day to day production activities and allows the chance to communicate with other team members.

Would you say that you have a good career?

Lean Manufacturing as a whole is an excellent career path to choose, as it can be applied so readily to any aspect of any business. For example, lean principles are notably being adapted into NHS thinking for eliminating and streamlining wasteful activities and processes.

Lean thinking is crucial for any company's continued growth and profitability and Lean Manufacturing Engineers will always be sought after.

Do you think your type of engineering makes a positive contribution to the wider world?

Lean Manufacturing Principles ensure that unnecessary waste and therefore costs are eliminated or reduced.

The equipment we produce and the services we provide to our customers are increasingly efficient, productive and competitively priced for the wide variety of applications in which they are used.

Terex Omagh crushers are used during construction of infrastructure around the world, including some well-known projects, such as the Rio de Janeiro World Cup 2014 and Olympic 2016 stadia. They are used in all sorts of demolition recycling, such as in the aftermath of natural disasters for clean-up operations and have even been used to destroy illegal ivory, seized by the U.S. government, increasing awareness of conservation efforts.

What has been your educational/professional route to this post?

I enrolled in the University of Ulster, to study BEng (Hons) Manufacturing Systems Management with a Diploma in Industrial Studies, to be gained through a placement year in Industry.

The placement year was incredibly beneficial for gaining an insight to life in employment and for making future career decisions. I can't recommend placement enough to future undergraduates.

As I was placed with a small manufacturing company producing heavy machinery, the range of experience I gained in Production, Manufacturing, Facilities and Supply Chain, was invaluable and I was offered a permanent position with the company upon graduation.

After commencing employment as Assistant Production Manager, I quickly progressed to Production Manager, primarily responsible for scheduling, assigning labour, shop floor supervision, quality checks and human resource management. Being the female manager of an all-male workforce had the potential to present a few challenges, but was actually a very successful and rewarding role, which I thoroughly enjoyed.

After working abroad for a time, I applied for a Manufacturing Engineer position in Terex. I started on the Omagh site in October 2010, progressed to Senior Manufacturing Engineer in 2011 and then to my current position as Senior Continuous Improvement (CI) Engineer in 2013, after finding that I had an affinity for Lean Manufacturing.

What do you really like about your job?

My job is so varied, it allows me the opportunity to get involved in numerous aspects of the business. This means it is always really interesting and I am always learning new things. I am not tied to a desk and often get to work with diverse teams of people, motivating them in driving change and helping them solve problems, which I find enjoyable and fulfilling.

I have also been fortunate enough to travel to various other Terex sites in Europe and in North America, which has been very inspiring and worthwhile for my own development personally and within the company.

Can you say anything about the future job prospects in your industry?

The Manufacturing / Engineering industry is a key foundation for any strong economy.

In 2012/2013, £16.9billion was generated for the N. Ireland economy through total manufacturing sales (detini.gov.uk).

This is all really promising for an exciting and profitable future in this industry and I would encourage any job seeker to consider the numerous opportunities on offer.

Would you recommend engineering to young people starting out on their career?

Absolutely!

Forget any traditional notion you have of what an Engineer is and recognise the incredible diversity of people and roles accessible to you.

The beauty of our industry is that there are countless paths available to choose from when you do join the workforce. ◆

Mechanical Engineers

Fiona Finlay

Project Engineer –
Moy Park, Craigavon



Can you describe a typical day?

No day in the life of a Project Engineer is ever the same! My day to day responsibilities range from installing equipment, such as a new oven or belt in the factory, to overseeing redevelopment work on site. I manage projects from the drawing board (so to speak) to completion - for example, we are currently working on an office redevelopment at our Craigavon site. I dealt with the initial design concepts and drawing up specifications – as well as keeping track of project costs throughout. I monitor the project every step of the way, dealing with whatever challenges crop up and ensuring everything runs smoothly. The nature of my job means I can be involved in any aspect of the project, from initial preparations for installation of equipment, to dealing with scheduling builders, plumbers and electricians – time management is key!

What has been your educational route to this post?

I studied A-level Physics, Maths and Chemistry at school and then went on to complete a Master's degree in Mechanical & Manufacturing Engineering at Queen's University Belfast.

What most influenced your choice of career?

I always knew I wanted to train for a vocational job and I had a passion for Maths and Physics. I had a friend who was a Mechanical Engineer and once I had spoken with them about a career in engineering, I knew it was for me.

What do you really like about your job?

For me it's the completion of a project - I love taking a piece of work from the initial concept and making it happen! With new equipment installation, I have to factor in factory layout, supply of services, drainage, safety and time scales, whilst ensuring any work I carry out is in line with the day-to-day running of the factory. I have to think of all possibilities to avoid any surprises – even basic things like checking the equipment fits through the doorways! I really enjoy being part of a team. My colleagues are great, they make my job fun and interesting and I get great support from all of them.

Can you say anything about the future job prospects in your industry?

The engineering industry has a wide range of opportunities for anyone who has the right attitude – namely a bit of gumption and common sense! Moy Park is a great example of a local company with a range of opportunities for graduates with engineering qualifications.

Would you recommend Project engineering to other young people?

My role as a Project Engineer is constantly changing, with new challenges everyday - so it would have to be a resounding yes! ◆

Mechanical Engineers

Gillian Harkness

Quality Engineer, Terex, Dungannon



Terex manufactures equipment used in the construction, quarrying and mining industries and has facilities all over the world including Dungannon and Omagh.

Describe your typical working day

As a Quality Engineer, I have responsibility for improving customer satisfaction across the product range. I work as part of a cross-functional team, to support production and approximately 80% of my day is spent on the shop floor. I am required to assure our products meet quality criteria, while liaising with production to continuously improve quality standards within our operations. We use lean manufacturing tools to monitor and deliver on our zero defects target. We also liaise with suppliers to optimise the quality of component parts.

Would you say your type of engineering represents a good career?

I think it is a good career, which offers many opportunities within the

engineering field.

As a quality engineer I have the opportunity to work with all areas of the business including the design, supply chain, production and manufacturing teams. There is a wealth of opportunity available to those who have studied STEM subjects. Terex have also launched a Women@Terex Initiative, which aims to increase the attraction, development and retention of women, particularly in leadership positions and line positions like Engineering, Sales and Operations.

How does your work impact on people's lives?

At Terex you contribute to producing the equipment that builds roads, bridges, hospitals, schools and other structures that help improve the lives of people throughout the world. As an example, our machines were used in preparation for London 2012, as well as to assist with clean up operations in countries after natural disasters.

What has been your educational/ professional route to this post?

I attended Omagh Academy Grammar School, where I studied Maths, Physics and Geography for A-Level. I then went on to study Mechanical Engineering at Heriot-Watt University. My first job was at Copeland Ltd, as an Industrial Engineer. Over the course of 10 years, I had the opportunity to work and travel in the US and to Germany and also completed my MBA at the University of Ulster. I joined Terex Omagh in 2008 as a quality engineer to gain further manufacturing experience and in 2011, transferred into a similar role at the Terex Dungannon facility.

What do you enjoy about your job?

I like that fact that no two days are the same and I am continually growing and developing my experience. In my time in Dungannon, I've been placed in different areas, so there's always plenty to learn. With the continuous development and introduction of new machines, there's always something new. I get to work with a diverse group of products and people, which exposes me to many different cultures and backgrounds and allows me to grow both individually and professionally

What are the future job prospects in your industry?

There are many job prospects available within the manufacturing industry. Here at Terex, the company is committed to promoting internally and support career development through formal training programs. Terex also offers engineering secondment opportunities to our facilities in the US, Asia and Australia.

Would you recommend your line of work to young people starting out on their career?

Entry level roles in engineering provide a fantastic grounding. Almost half the world's crushing and screening industry is based in the Tyrone area, as is the supply base that feeds it. Terex is continuing to expand its operations in Northern Ireland, which will create many opportunities for those studying STEM subjects. ◆

Mechanical Engineers

Ronan Harkin

Graduate Project Design Engineer,
CDE Global, Cookstown



Can you describe a typical working day?

A typical day as a Project Design Engineer can involve ordering parts/components for the manufacture of standard machinery and also designing any non-standard parts for on-going projects.

I am responsible for developing standard products, by implementing improved designs and processes. I also provide technical assistance to fabrication and assembly teams during the manufacture of any machines that I was involved in during the design process.

Would you say that mechanical engineering represents a good career?

I would say that mechanical engineering is a very good career choice. There is a wide range of applications where this career can be applied, providing endless opportunities for development as an engineer.

How does mechanical engineering make the world a better place?

I am evolved in designing machinery that will be used to wash raw aggregate material. By designing more efficient machinery, we can reduce the amount of the world's raw material that is lost/wasted during the washing process. At CDE, we also provide a range of recycling equipment that can be used to reduce the amount of waste aggregate material being sent to landfill sites.

What has been your educational/professional route to this post?

After completing my Leaving Certificate Exams at school level, I studied Mechanical Engineering at the University of Ulster at BEng Level. I later transferred onto the MEng Mechanical Engineering Degree, where I studied at both the University of Ulster and the Augsburg University of Applied Sciences. After completing that degree, I was offered employment at CDE Global as a Graduate Project Design Engineer.

What do you really like about your job?

What I like most about my job is the wide range of activities that I am involved in, ranging from detailed design projects, to providing assistance to the manufacturing team on the shop floor. I have also been given great opportunities to travel, on site visits, across the world.

Can you say anything about the future job prospects in your industry?

From my experience of work in a mechanical engineering field, I see continual growth in the industry which is, in turn, leading to a high demand for qualified mechanical engineers worldwide.

Would you recommend mechanical engineering to young people starting out on their career?

I would highly recommend mechanical engineering to anyone starting out on a new career path. Mechanical engineering can be applied in a wide range of industries and this, in turn, provides good opportunities for employment and travel. ◆

Mechanical Engineers

David Elliott

Final Year Apprentice Project
Design Engineer - CDE Global



Can you describe a typical working day?

A typical working day involves 3D and 2D design, combined with problem solving and key thinking as part of a team. It can range from day to day on the specifics of what you are doing, to working with new challenges to solve and overcome.

Would you say that design engineering represents a good career?

Design engineering, as many other forms of engineering, has excellent starting salaries and benefits, with the ability to advance to higher levels with commitment and application. I would recommend design engineering to anyone interested, as it a good career with plenty of prospects for further development.

How does design engineering make the world a better place?

Problem solving and logical thinking has developed the world into the modernised place it is and it is with constant innovative ideas from the engineering sector that we continue to grow and develop ourselves. One small idea = One big difference.

What has been your educational/professional route to this post?

Completed GCSEs and A-levels in secondary school, moved onto an apprentice scheme within South West College and joined CDE as an apprentice.

Year 1 + 2 = Level 3 diploma in Engineering, NVQ Level 2&3 Engineering + Co working through CDE

Year 3 + 4 = Foundation Degree in Manufacturing Engineering (Currently moving into my fourth year) + co-working through CDE

What do you really like about your job?

I enjoy the problem solving and the 3D design within my job and particularly like the opportunities given to me to help further myself.

Can you say anything about the future job prospects in your industry?

I will finish my foundation degree next year and become a Design Engineer. From there, I will hopefully progress my career further up the ladder, as there are opportunities opening up all the time.

Would you recommend design engineering to young people starting out on their career?

Absolutely, with the industry and time we are in, engineering has some excellent career opportunities across all sectors for innovative people, who want to make a difference. ◆

Mechanical Engineers

Julie Anderson

Senior Mechanical Design Engineer, Sensata Technologies (formally Schrader Electronics Ltd.)



Can you describe a typical day in the role of a Mechanical Design Engineer?

There is no such thing as a typical day for most mechanical engineers. Projects move through different stages and can change very quickly, so the issues and challenges faced constantly evolve. The role always requires a great deal of communication. This can be with people inside or external to the company. My role currently requires a lot of customer interaction and although this mainly happens from the office, it can, at times, mean travelling across the globe to meet face-to-face.

What made you choose Mechanical Design?

From a young age, I was curious about how things work, but my interest in Mechanical Engineering was first sparked on a visit to my uncle's welding and fabrication business in Australia. They manufacture and maintain huge pieces of equipment for the mining and exploration industry. The sheer scale of things impressed me and I

was intrigued by how these machines were designed and assembled. My first job from university was as a Manufacturing Engineer, where I experienced the assembly side of the process. This gave me real world insight into the importance of good design and the challenges it poses, so when the opportunity to work as a Mechanical Design Engineer came up, I was keen to put what I had learned into practice.

What was your educational route to this role?

I studied Maths, Chemistry and Physics at A- Level, followed by BEng (Hons) Mechanical Engineering at the University of Ulster.

What opportunities have you had in your role?

In my role with Schrader, I have had many opportunities to travel to countries across the world, including Japan, China and the USA. My greatest opportunity so far has been to take a secondment in Munich for a year, where I took up the role of mechanical liaison for the Schrader sales team. Luckily, Schrader management actively encourage such adventures.

What do you really like about your job?

I like the variety of my job – you never know what each day will bring, especially when dealing with customer demands. I also like the satisfaction of problem solving and the organisation and detail required as an engineer in this industry really appeals to me.

What does the future hold for your Industry?

I am optimistic for the future of mechanical engineering in Northern Ireland. Northern Ireland has a long history of innovation and Schrader Electronics is a testament to that. If we can continue to produce a high calibre of engineering talent, I believe we can maintain and attract new and innovative companies here. There is currently high demand for engineers, both locally and internationally and as engineers are at the forefront of technology and development, I can't see this changing.

What is the best advice you have received?

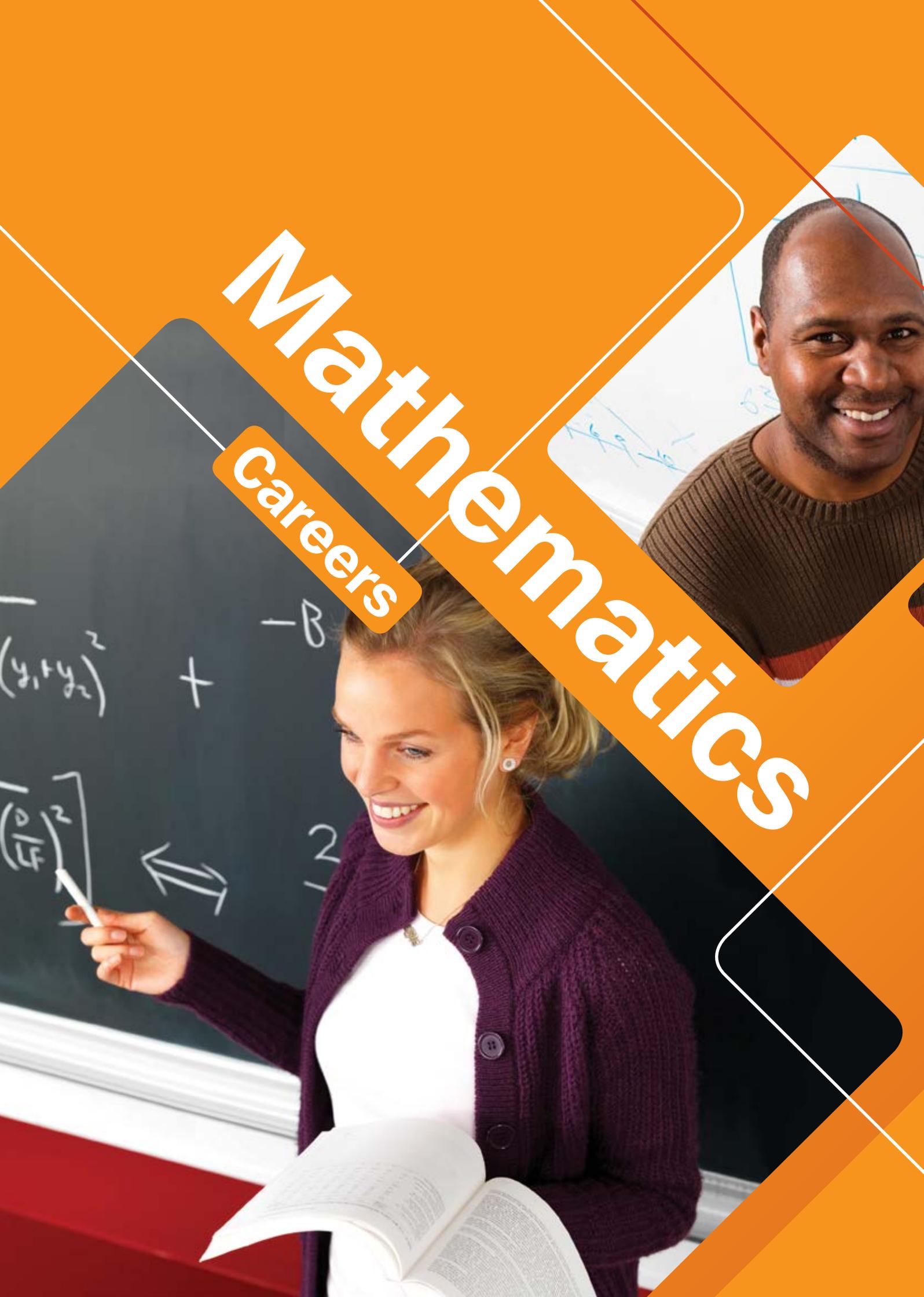
Don't be afraid to stand out from the crowd. As a female mechanical engineer this can be unavoidable, but until you step outside your comfort zone, you will never know the full extent of what you can achieve. ◆

Mathematics

Careers

$$(y_1 + y_2)^2 + -B$$

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Introduction

Mathematics is a key STEM subject and having numeracy skills underpins many of the qualifications and careers discussed in this document, however there are numerous STEM businesses in which degrees in mathematical subjects are much sought after. As the profiles in this section show, these posts include data and financial analysts and process control engineers. Data analyst has been listed as one of '10 jobs that didn't exist 10 years ago' by the Digital Marketing Institute in 2014. However, the area of data analysis of Big Data is likely to grow and impact more on our lives, as it can be used to spot business trends and even help to diagnose and prevent diseases and combat crime.



Mathematics

Sarah Thompson

Data Analyst, Deloitte

Can you describe a typical working day?

We use a range of agile techniques in the deployment, delivery and management of analytic services and solutions to solve business challenges faced by our clients, across a wide variety of industry sectors. Currently, I am working as part of a large team developing an enterprise performance management system for a government body, which will transform how they manage their financial data. A working day can vary between liaising with clients, providing training to a range of stakeholders and working closely with the project team to design and develop a solution using leading technologies, including IBM Cognos TM1 and Microsoft SQL Server.

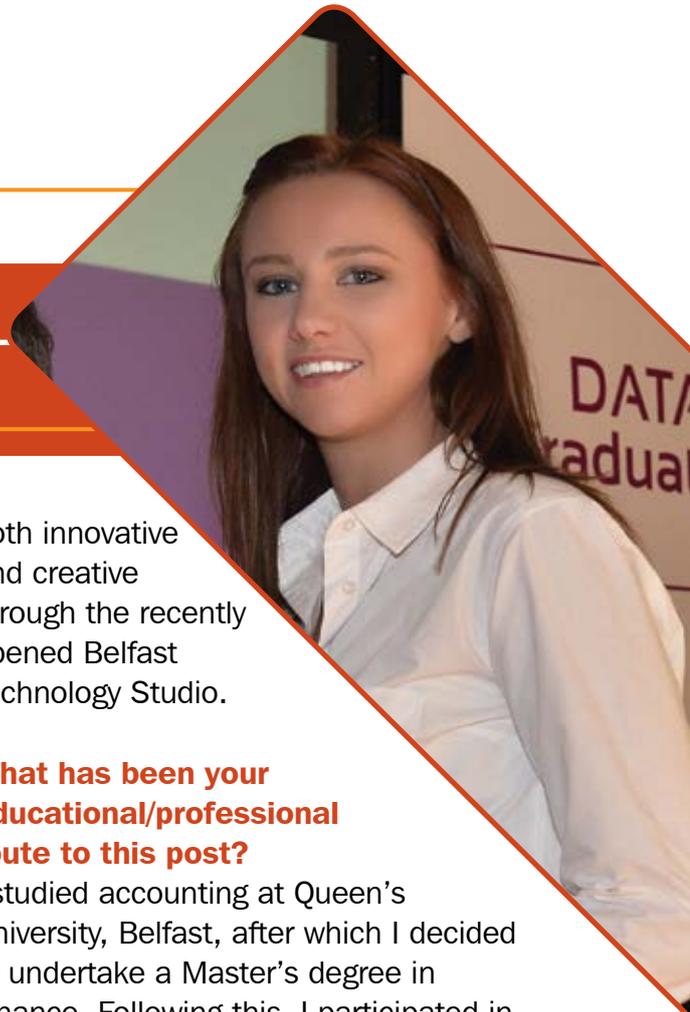
Is data analytics a good career?

Data analytics is an interesting career, which is highly competitive and rewarding. Deloitte offers a competitive salary for graduates, supporting further learning and training and providing many opportunities to progress within this industry. Deloitte also offers a new type of working environment which is

both innovative and creative through the recently opened Belfast Technology Studio.

What has been your educational/professional route to this post?

I studied accounting at Queen's University, Belfast, after which I decided to undertake a Master's degree in Finance. Following this, I participated in the inaugural Deloitte Analytics Training Academy, funded by the Department for Employment and Learning under the Assured Skills programme, which included an intense nine-week training course in data analytics and a five-week placement in Deloitte. The Academy provides graduates who have an array of different degree types with an insight into how data analytics can be combined with business intelligence to provide unique ways of problem solving. My educational background is non-technical and it gave me the opportunity to develop these skills, which I now use in my every day work, as well as gaining industry-recognised qualifications.



What do you really like about your job?

I like the variety - day to day activities vary quite significantly, depending on the phase of the project and the particular client. It also involves travelling to various destinations within Britain and further abroad. The work can be challenging, but also rewarding as you are continually trying to exceed a client's expectations, as well as develop new business and technical skills. It is satisfying to know that within a project you are not only involved in building a solution, but also have the opportunity to further your technical ability, develop personally and build strong relationships within Deloitte and also with clients.

Can you say anything about the future job prospects in your industry?

I think data analytics will become even more applicable to how we do business in the future, as it is becoming more widely recognised that a better understanding of data can make a significant difference to the success of your business within any type of industry.

Would you recommend data analytics to young people starting out on their career?

I would recommend data analytics to young people as a career choice, as organisations are only now realising the full potential of their data. It is very satisfying to be able to work on something which will have many benefits to the customer and can shape how their business develops. Regardless of what discipline you studied, if you are interested in problem solving, facing new challenges and learning a new set of skills, then a career in data analytics will be enjoyable and stimulating. ◆

Mathematics

Joanna Donaldson

Data Science Stream, First Derivatives, Newry



Can you describe a typical working day?

At First Derivatives Plc, they invest a lot of time into training new graduates to ensure they have the excellent financial and technical skills required to be top-class consultants within the Capital Market industry. Currently, I am still in the training program, and within the last month have sat eight internal exams, which have been a mixture of technical, financial and consulting. Data Scientists are also required to learn kdb+, the fastest programming language in the world. Daily classes are held, where graduates receive training from those with experience in this field.

Does Data Science represent a good career?

Data Science requires the best software to cope with high volume and high velocity information it collates on a daily, even on a minute, basis! First Derivatives has anticipated the demand for Data Scientists and so commenced a Data Science stream in January 2014. This new, innovative and rapidly expanding field is very exciting for someone like me, who has an interest

in the financial markets, but also in the technology required to support each and every transaction.

How does Data Science make the world a better place?

Big Data enables companies to make the best decisions based on analysis of past strategies. Efficiency should be improved as a result, lowering the cost of marketing. As consumers, we can also benefit as companies know, for example, when we need to be offered that extra discount to keep us brand-loyal.

What has been your educational/professional route to this post?

I studied Maths, Further Maths, Business Studies and Latin at A-Level, before completing a four year BSc Actuarial Science and Risk Management degree at Queen's University, Belfast. My third year was a placement year, which I spent in the Actuarial Operations team in Capita Life and Pensions, Dublin. I decided to venture into the data science field after encouragement to do so from a lecturer, due to my relevant skills.

What do you really like about your job?

I really like the unique combination of financial and technical skills within my job. Having come from a finance/ maths background, I had very little technical knowledge before starting my new job and am now one of only 200 people worldwide who know kdb+! First Derivatives also offers the opportunity to work with very well-known clients in the Capital Markets industry, so your CV can look very impressive within a short period of time!

As well as kdb+ training, I also have the opportunity to learn more about the financial markets and pick up other technical skills, like UNIX, SQL and Java.

Can you say anything about the future job prospects in your industry?

Big Data is a currently a buzz word in the finance industry and companies are increasingly finding the benefits it can bring, whether in anticipating when an employee will leave, what advertising strategy worked best on what day, or how current events affect customer decision making. Within the actuarial field, predictive analytics has always been an integral part of the job; now predictive analytics is being used in a huge variety of sectors for a wide range of purposes.

Would you recommend Big Data to someone starting out on their career?

Definitely! Working in such a specialist field is undoubtedly a challenge, but one which is worthwhile. The field of Big Data offers great opportunities and those with expertise in this area will be in high demand for the coming years. ◆

Mathematics

Claire Brennan

Financial analyst, FinTrU



Can you describe a typical working day?

Financial analysis at FinTrU provides me with the opportunity to utilise both qualitative and quantitative skills. Currently, I am working on a project involving a New York based Regulatory reporting firm, in which I undertake a number of tasks. Contact with the Head Offices in New York and to clients of the firm is a regular occurrence, especially coming up to reporting deadlines, when the workload and pressure on time is key. I personally enjoy this high-octane work environment, as I believe this is where I thrive and it gives a sense of satisfaction at the end of the day.

What has been your educational route to this post?

After completing my A- Levels in Maths, Further Maths and Biology at Our Lady's & St. Patrick's, Knock, I decided to take the road less travelled by girls in my year and undertake a degree in Mathematics at the University of Manchester.

I thoroughly enjoyed my time at Manchester and although the course was tough at times, in retrospect I am glad that I chose Maths. Having a degree in Mathematics has put me in an advantageous position in the job market and has allowed me to get a graduate job straight out of university.

I was able to study areas of mathematics that stimulated me the most, through the wide range of module choices at the University of Manchester. The hard work involved harnessed my analytical skills, allowing me to apply these in the workplace, thus making the transition from university to work life easier.

These skills were also called upon during my time at the FinTrU Academy, which was funded by Assured Skills in the Department for Employment and Learning. Although there was training in soft skills, such as public speaking and presentation skills, it gave me the opportunity to hone and develop the analytical skills necessary to be competent and confident for a role in financial analysis, such as learning coding languages and accounting methods.

I enjoyed my time at the academy because of the new skills that I learned and also getting to know my colleagues on a personal level.

How does your work as an analyst make the world a better place?

Given that my role involves the implementation of financial regulation, this means that I am contributing to making sure that a financial crisis, such as that of 2008, will not happen again. A more transparent financial system is integral to all aspects of the economy operating more efficiently, thereby contributing to economic growth and employment prospects.

What do you really like about your job?

Apart from the work itself, I really enjoy the opportunities that FinTrU has given me to excel personally, as they have a culture of investing in their employees which I appreciate. The work has sometimes required me to travel to London and New York, in order to meet obligations. I also enjoy the unique position that I am in; working with people who are all in my age group, as this means that the social aspect to FinTrU is particularly enjoyable, compared with other jobs.

Can you say anything about the future job prospects in this industry

Being one of the first employees of FinTrU has meant that I have witnessed first-hand its rapid growth and have helped shape the company culture. It is inspiring to be part of a company like FinTrU, as it is well positioned for continued rapid development. I am excited to be part of this journey and to grow personally and professionally within the company.

FinTrU is investing in my professional growth in the form of professional qualifications. This is not only great for my personal development, but also my career, as possessing a professional qualification would lead to other opportunities for work within FinTrU.

Would you recommend a career in this industry to other young people?

I would highly recommend a career as a Financial Analyst to young people who are thinking of applying. ◆

Mathematics

Áine Molloy

Process Control Engineer, Seagate



Can you describe a typical day?

I work for Seagate, a world leader in developing and manufacturing data storage solutions. At the Springtown campus, we develop and manufacture read-write heads for our hard drives, using tightly controlled and complex processes. The equipment and materials involved are highly specialised and very expensive, so any opportunities to improve equipment health and product quality are of huge benefit to the company.

My day is dictated by whatever I'm working on at the time. I'm currently working on applying multivariate analysis techniques to our equipment. Any piece of equipment will have several input variables, such as pressures, voltages, flow rates etc. and monitoring these on an individual basis can result in a huge amount of control charts. I am taking all of these inputs and condensing them into one statistic, which can then be monitored and will alert the engineer to any problems with the equipment, if it goes outside its limits.

I spend a lot of time researching (which can involve reading anything from

academic papers to Wikipedia pages) and becoming proficient in coding in the R programming language. R is an open-source programming language for statistical computing. It's a great language to become familiar with, as it is free to use and has a wealth of maths and statistics packages.

Would you say yours is a good career?

Process Control is a great area to work in, as it is so varied in the types of projects taking place. Having come into the role with no experience in the area, I could see very quickly how much room there is for growth and career progression. There will always be new control issues in a factory and hence there will be a need for new and sometimes more challenging and complex solutions to those problems, giving an engineer the opportunity to learn new skills and to develop novel analysis techniques. Process Control gives me the opportunity to apply the skills and knowledge I gained in my degree to real, everyday issues, in a way I never thought I would be able to.

What has been your educational route to this post?

After completing my Leaving Certificate at Loreto College, Letterkenny, I went on to study for a BSc (Hons) in Maths and Physics at the University of Edinburgh. I then spent a few years working in various roles and travelling, before returning to Ireland. I decided when I graduated that I wasn't ready to commit to a career straight away and I've never regretted that decision.

Can you tell me how your maths and physics skills are utilised in your current post at Seagate?

As a student, I was frequently told that a maths graduate isn't hired for what they know, but rather for how they think.

Coming from a maths and physics background, there is quite a difference in my approach to a given problem to that of an engineer. My starting point for any research is to go back to the basics of the maths involved and build my understanding from there. Many of the problems encountered in factories now are data-related problems, solutions to which require an analytic thought process and an understanding of how to apply various mathematical and statistical techniques to the problem at hand.

How does your work as a process control engineer at Seagate impact on people's lives?

When I was studying for my degree, I really had no idea what sector I'd find a job in. It never occurred to me that I would end up working in one of the

most complex and cutting edge facilities in the recording head industry. As I get to know more about Seagate, I'm discovering that the company plays a hugely significant role in helping people and businesses all over the world create, share and preserve their most critical data and most precious memories – and in capacities that didn't seem possible several years ago. It's a privilege to be playing a part in that.

What do you really like about your job?

I really like the challenges involved in my role. I am given a problem and I have to start from scratch to understand firstly what the problem is and then how I can go about solving it. I am learning about things that I had never come across in my academic career, and I am gaining knowledge across a range of disciplines - data analytics, programming, data storage, statistics and, of course, the engineering involved in the work that is being carried out in the factory on a daily basis.

Would you recommend your subject and career choice to other young people?

Absolutely! When I first read the job description for my position, I thought 'I don't know what any of that means, I can't do that job', but as I looked into what was involved in process control, it became increasingly evident that so much of what is involved comes down to maths and mathematical applications. Maths, as with any of the STEM subjects, is an excellent starting point if you are unsure as to what you would like to do after your degree, as you are gaining valuable skills, but you are not being confined to one career path. ◆

STEM Pathways to a professional career

The variety of profiles in this booklet demonstrates the range of professions that STEM courses can lead to and the different routes that individuals have followed such as apprenticeships and Further or Higher Education. Most of these professions are represented by Learned Bodies or Societies and full membership of these societies can normally be achieved in a number of ways.

For many parents, trying to help their children with course and career choices, the ultimate goal of a well-paid, interesting and professional post is vital. It is important to realise that all the fields of engineering and science represented in this booklet are also professions and in fact the Engineering Council lists 35 Professional Engineering Institutions¹⁸ whilst the Science Council has 41 members¹⁹. As STEM developed over time, so too did the professional bodies: the Institution of Civil Engineers was established in 1818 whilst one of the youngest, the Institute of Acoustics, was formed in 1974. Many of the Institutes also have career sections on their websites, the pages which follow include a few examples.

18 <http://www.engc.org.uk/about-us/our-partners/professional-engineering-institutions/>

19 <http://www.sciencecouncil.org/our-members>

Science

Society of Biology:

<http://www.societyofbiology.org/>

Career Resources for both school and undergraduate students:

<http://www.societyofbiology.org/careers-and-cpd/careers/career-resources>

Society of General Microbiology:

<http://www.sgm.ac.uk/>

Careers page:

<http://www.sgm.ac.uk/all-microsite-sections/careers/index.cfm>

Biochemical Society:

<http://www.biochemistry.org/Home.aspx>

Careers page:

<http://www.biochemistry.org/Education/Schoolsandcolleges/Careerprofiles.aspx>

Institute of Physics:

<http://www.iop.org/>

Careers page:

<http://www.iop.org/careers/index.html>

Royal Society of Chemistry:

<http://www.rsc.org/>

Careers page:

<http://www.rsc.org/careers/>



Engineering

Institution of Civil Engineers:

<https://www.ice.org.uk>

Careers page:

<https://www.ice.org.uk/careers-and-professional-development>

Institution of Engineering and Technology:

<http://www.theiet.org/>

Careers page:

<http://www.theiet.org/careers/index.cfm>

Institute of Mechanical Engineers:

<http://www.imeche.org/>

Institution of Chemical engineers:

<http://www.icheme.org/>



Technology

British Computer Society:

<http://www.bcs.org/>

Careers in IT, Leaflets:

<http://www.bcs.org/category/7874>

Career pathways in IT:

<http://www.bcs.org/upload/pdf/ukpaths.pdf>

Institute of Food Science and Technology:

<http://www.ifst.org/>

Student pages:

<http://www.ifst.org/communities/students>



Mathematics

Institute of Mathematics and its Applications:

<http://www.ima.org.uk/>

Careers page:

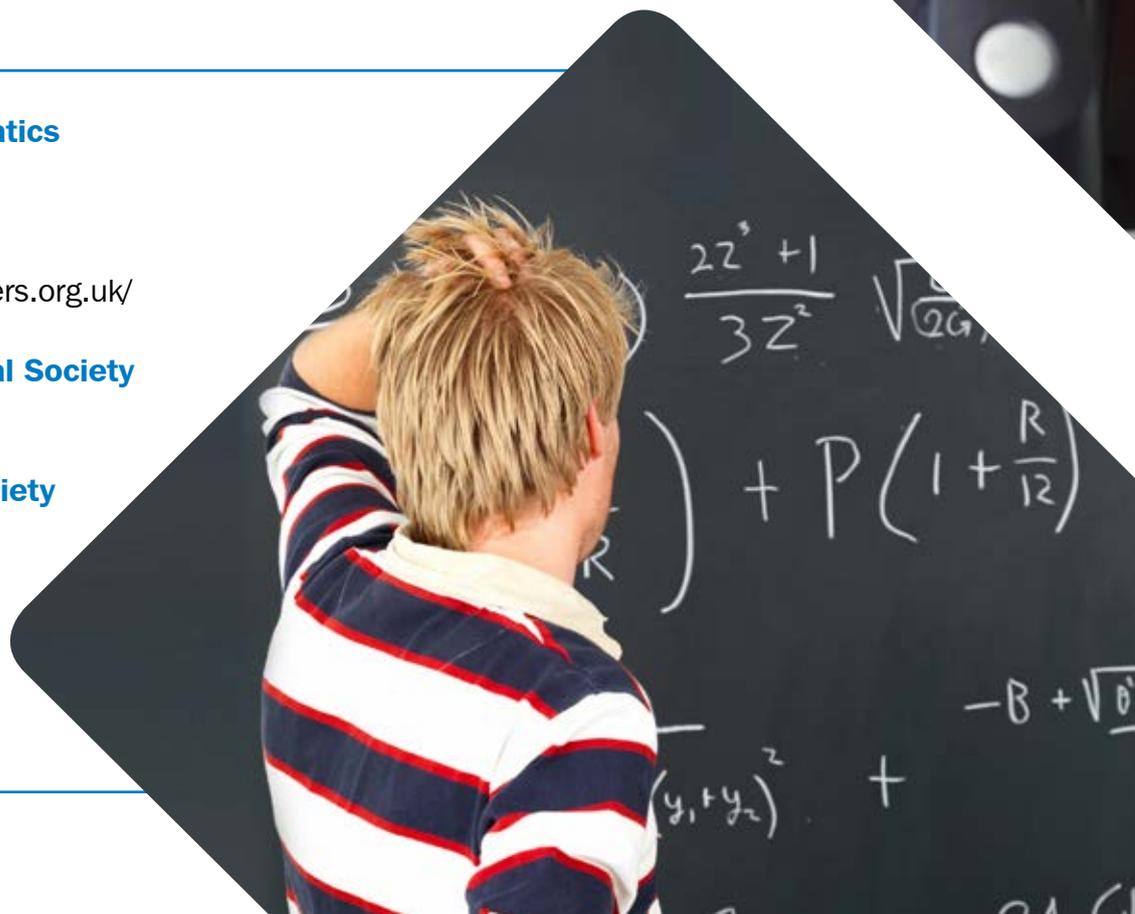
<http://www.mathscareers.org.uk/>

London Mathematical Society

<http://www.lms.ac.uk/>

Royal Statistical Society

<http://www.rss.org.uk/>



Where to find more information - how the Careers Service can help

As you will have gathered from this booklet, there are many STEM-related employment options out there with jobs to suit all personalities and all skill levels. You may have been surprised to learn that studying STEM subjects opens up a huge variety of exciting and rewarding career opportunities.

If you want to know more about pursuing a career in a STEM-related sector, you can visit the nidirect website at www.nidirect.gov.uk/careers. The website carries extensive information on education, skills and training. In addition, careers Industry Factsheets are available at www.delni.gov.uk/publications/industry-fact-sheets, providing information on employment opportunities, qualification requirements, wages and job trends in a wide variety of occupational sectors across Northern Ireland. They are a valuable source of information, providing an analysis of current and future employment trends in 24 industries. The information in these factsheets is not just for students, but should be considered by anyone of any age planning a career, looking for a change in employment, or weighing up future study.

When choosing GCSE and AS/A-Level subjects, it is important to consider how these choices will affect future job prospects. It is more important than ever to consider where the jobs are now and where they are likely to be in the future.

It can be hard, however, to make the link between what is studied in the classroom and the opportunities available in the world of work. You can explore how qualifications and school subjects link to possible careers by using the Careers A-Z tool at www.nidirect.gov.uk/careers. While it is important to study subjects you enjoy, it is also advisable to consider the career opportunities which lie ahead. Choosing work experience in STEM-related and growth sectors can broaden your knowledge and experience of careers in these areas.

Personalised help is available from the Department for Employment and Learning's professionally qualified careers advisers, who can offer information, advice and guidance to help you consider your skills, qualifications and experience, identify opportunities and develop achievable career plans. Careers guidance can help people of all ages analyse labour market trends and opportunities, make informed, appropriate and achievable decisions in relation to education, training and employment and help you achieve personal career goals.

Accurate and up to date information on current and future jobs provided by economists and employers, relevant to both the local and international job market is a crucial factor when making decisions regarding a future career path. The Careers Service, recognising the importance of high quality labour market information, has trained all its careers advisers in the interpretation and use of this data.

If you need any further information, please go to <http://www.nidirect.gov.uk/careers> where you will find the contact details for your nearest Careers Office and careers adviser. You can also contact the Careers Service by phone on 0300 200 7820.

Parents can also help you explore your career options by listening to your ideas and helping you to find out what you need to get there. If any parents need further information, the Careers Service has produced a document called "A Guide for Parents – How to help your child with future career plans" which can be found at www.delni.gov.uk/publications/parental-guide. Areas covered in the guide include information on what careers are likely to be in demand in the future, such as STEM-related careers, and subject choice at year 10. It also provides details on the different options after Year 12, 13 and 14.

If you are currently in education, you can also get information and advice from your careers teachers in school. STEM teachers could also be a valuable source of assistance. For those in further or higher education or recent graduates, help may also be available from college and university Careers Services.

Useful Websites

NI Direct Careers Website: <http://www.nidirect.gov.uk/careers>

General STEM Careers Information

Where STEM can take you: <http://www.wherestemcantakeyou.co.uk/>

STEMNET <http://www.w5online.co.uk/stemnet/careers/>

Queen's STEM Careers: <http://www.qub.ac.uk/sites/STEM/>

Tomorrow's Engineers: <http://www.tomorrowseengineers.org.uk/>

STEM Careers database: <http://faraday.theiet.org/careers/database/index.cfm>

Brightside Bright Knowledge: <http://www.brightknowledge.org/bright-knowledge>

Industry specific websites

Food: <http://tastycareers.org.uk/case-studies>

IT <http://bringitonni.info/>

Aerospace: <http://www.careersinaerospace.com/>





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