



# A FUTURE IN CHEMISTRY.

YOUR OPTIONS FOR  
A CAREER IN CHEMISTRY.

CHEMISTRY.  
MAKING THE  
DIFFERENCE.

# WHAT IS CHEMISTRY?

**The air you breathe, the food you eat and the clothes you wear – they're all chemistry. Chemistry is the study of substances: what they're made of, how they interact with each other and the role they play in living things.**

From research in space, to the depths of the oceans, chemistry helps you understand the world around you. Chemistry also forms the basis of other related subjects such as:

- environmental chemistry – understanding and solving challenges such as climate change, pollution or waste management on a molecular level
- materials chemistry – looking at the chemical structure of materials and using this knowledge to develop the materials of the future
- biological sciences – such as biochemistry, molecular biology and pharmacology

**SHARON LAWTON PHD**  
SCIENCE FOR LIFE OFFICER, CORK INSTITUTE OF TECHNOLOGY

"I've always been interested in environmental issues and during my research and in my current role I've had to use a large amount of chemistry – there's always something new to learn. I'd really recommend working in environmental chemistry. It's multidisciplinary and there's lots of variety in the job which I think is a big advantage."



## USE CHEMISTRY TO MAKE THE DIFFERENCE.

**Chemists make a difference! Breakthroughs in chemistry impact our everyday lives and chemists play an important role in shaping the world around us, solving big problems and changing lives through new medicines and materials, as well as fixing the future with sustainable energy sources.**

**START WITH CHEMISTRY - END UP CHANGING THE WORLD.**

# WHY STUDY CHEMISTRY?

**Chemistry-based jobs are interesting and rewarding with many opportunities available in research, education, field work and other industries you might not have thought of.**

Lots of trained chemists work outside traditional chemistry careers because chemistry is all around us, and the skills you develop from a chemistry qualification can be applied to many areas. A chemistry qualification opens the door to so many career options, not just in the lab.

## REASONS TO STUDY CHEMISTRY

- it's highly sought after in Ireland which has a buzzing biopharmaceutical research and manufacturing sector
- you can apply chemistry to lots of different subjects, so it gives you a great foundation
- it's a core subject that enables you to cross over to the other core sciences or venture into biochemistry, geochemistry, chemical engineering or physical chemistry
- you just love chemistry!



**CATHAL CONNOLLY**  
ASSOCIATE DIRECTOR OF RESEARCH, ALLTECH

"I'd really recommend to young people with an interest in science that they get into the chemistry and life sciences sector - it's a fantastic career move. An education as a chemist gives you a superb grounding in analytical thinking that stands you in good stead for problem solving across the life sciences sectors, from microbiology to biochemistry and biotechnology. I'd say that a degree is essential in a research line of work, since you need the depth of understanding in order to solve the problems and plan the experiments that will come with production and analysis challenges."

# A CAREER IN CHEMISTRY. WHAT'S IN IT FOR YOU?

**A strong understanding of chemistry is required by many of the major industrial and life science employers in Ireland, such as biopharmaceutical, chemical manufacturing, medical devices and diagnostics, food and drink and analytical testing laboratories.**

In the world of work there will be lots of challenging ways to apply your chemistry knowledge to solve problems, open up collaborations and work abroad.

Future skills forecasts predict a need for people who can understand and solve unique challenges within science.

A life science qualification will provide you with an excellent range of related skills including problem solving, thinking logically, data handling and analysis, teamwork, report writing and many laboratory techniques. These skills can open the door to a huge range of job opportunities that offer good pay and benefits.

# WHAT COULD YOU BE DOING?

In 2019 the Irish biopharma and pharmachem industry directly employed 30,000 people in over 75 companies. 50% of Ireland's total country exports are generated by the biopharma, pharmaceutical and chemical industry, and the industry was estimated to be worth €73bn in 2018.

The global top 10 biopharmaceutical companies all have a manufacturing presence in Ireland and €1.8bn was invested in manufacturing process development in 2017\*. It's an exciting time to be involved!

Research and development chemists are problem solvers who use different techniques and data to discover new medicines or materials that help people who are sick. The pharmaceutical industry employs process chemists who take these new materials or medicines and make them on a large scale so everyone can access new life-changing medicines.

## WHAT CAN YOU EXPECT TO EARN?

The Royal Society of Chemistry's *2019 Pay & Reward Survey* showed a median salary of €64,300 for respondents working in Ireland†.

If you want to find out more about salaries in a particular career area, current job ads and career websites focusing on topics relevant to your area of interest are good sources of information. Remember that salaries depend on a number of factors including: qualifications required, location, experience, size and type of the organisation.

\* Information kindly supplied by Biopharmachem Ireland who are a business association within Ibec representing the biopharma and chemical sectors. Information accurate as of August 2019 and available at: [www.biopharmachemireland.ie](http://www.biopharmachemireland.ie). We thank BCPI for their contribution to this booklet.

† Results based on 6,194 members of the Royal Society of Chemistry who responded to the 2019 survey with profiles representative of current membership.

## DENISE CROKER PHD

EXECUTIVE DIRECTOR, SSPC, THE SCIENCE FOUNDATION IRELAND CENTRE FOR PHARMACEUTICALS

"My career has taken lots of turns along the way to my current role. I've been able to travel, work with great people and tackle new interesting problems and challenges. In this sector the options are limitless if you want to try new things."



## WHAT DOES THE FUTURE LOOK LIKE IN THE SECTOR?

The way the pharmaceutical industry discovers and produces the medicine we rely on is changing. There will be a demand for expertise in biological and large molecule drug discovery and continuous manufacturing practices:

- we'll need scientists to help overcome chemical, biological and engineering challenges associated with working in these sectors
- we'll need quality control and quality assurance specialists, chemists, analysts and technicians to ensure these medicines meet international quality standards and are safe for us all to use
- 'soft' skills such as leadership and teamwork will also continue to be valued as the sector works more and more across scientific disciplines and at the interface of industry and education – providing exciting opportunities for collaboration, relationship management and travel
- other areas to watch include food science and medical devices

# HOW CAN I FIND OUT MORE WHILE I'M AT SCHOOL?

There are great opportunities while you're at school to explore science and chemistry in more detail, and to try out some career options.

## WORK EXPERIENCE

Ever wondered what it would be like to work in a science lab? You could spend some time on a work placement investigating your future career path and learning new skills. You can find out more about a work experience placement here: [www.careersportal.ie/work](http://www.careersportal.ie/work). There are also skills competitions to enter.

## SCIENCE PROJECT

If you love the excitement of practical science, then try your very own science project. For inspiration you could attend a local science festival, SciFest fair, or the BT Young Scientist and Technology Exhibition.

<https://scifest.ie/>

<https://btyoungscientist.com/>

## A CAREER IN SCIENCE

If you're thinking about a career in science and want to know more about it, why not go to an open day or a tour of a local scientific business or college? The Smart Futures programme can even arrange for a scientist to come to your school:

[www.smartfutures.ie](http://www.smartfutures.ie)



## MARIE KISSANE

TEAM LEADER, ELI LILLY

"I loved science at Junior Certificate but I attended a small school and chemistry was not available as an option for the Leaving Certificate. I did a general science course in my first year of college and took extra chemistry classes for students who had not studied the Leaving Certificate in chemistry.

I'm now a Team Leader of the Small Molecule Technical Services / Manufacturing Sciences Group at the Eli Lilly API manufacturing site in Kinsale. Our team are responsible for ensuring that the active ingredients we produce in Kinsale are manufactured to the highest standard and in the safest way possible. My team and I work very closely with production, engineering, quality and analytical to ensure that our medicines are available to patients worldwide. My role is very diverse and the company really invests in me - it's a great place to build a career."

## WHAT ARE MY SENIOR CYCLE OPTIONS IF I'M INTERESTED IN A CAREER IN CHEMISTRY?

Studying as many science subjects as you can at Senior Cycle is important if you plan on working in the sector. If you're undecided about your future plans, studying chemistry and other sciences can help you keep your options open. Remember, if you decide not to continue with chemistry in the future, having a good foundation in science and maths is useful for a wide range of careers, even outside of science.

If you're not sure about what the best option is, talk to your teachers or career guidance counsellor.

# QUALIFICATIONS.

## WHAT DO I NEED TO GET INTO COLLEGE?

### HIGHER EDUCATION.

For entry onto a science degree programme you usually need a laboratory science subject at Leaving Certificate or equivalent level. Chemistry is a useful choice as it links with the other sciences but most courses will also allow you to catch up with the chemistry you've missed during the first year of your programme.

The points that you will need vary for each course and institution. You can find out more by visiting institution and university websites, or via the Central Applications Office (CAO) course finder: [www.cao.ie/courses.php](http://www.cao.ie/courses.php)

### FURTHER EDUCATION.

If you think you might want to work in the scientific sector you could consider taking a pre-university course in science. These are usually considered a stepping-stone towards a degree or further training.

You should speak to your teachers and careers guidance counsellors before making your choice.

### GWEN HAMMOND APPRENTICE

"I've gained invaluable hands-on experience from working in the industry three days a week while also receiving an education. I've found that the apprenticeship learning approach allows me to put the theory from lecture material into practice. The apprenticeship has helped me to kickstart my career in the science industry."

### WHAT IS AN APPRENTICESHIP?

**Apprenticeships are formal programmes of on-the-job training combined with academic study delivered by an education or training centre.**

The Laboratory Technician and Laboratory Analyst apprenticeships are suitable for those who want to pursue a lab-based career in the biopharma, chemical manufacturing, medical devices and diagnostics, food and drink and analytical testing laboratories. They are designed for school leavers, and those looking to upskill, retrain or return to a lab-based role.

Find out more: [www.laboratoryapprenticeships.ie](http://www.laboratoryapprenticeships.ie)

# STUDYING AT UNIVERSITY/ THIRD LEVEL

Over half of individuals working in the biopharmachem sector are third-level graduates compared to the national average of 24% (source: [www.biopharmachemireland.ie](http://www.biopharmachemireland.ie)).

There are a large number of options for taking chemistry or closely related subjects to degree level in Ireland, and all over the world.

If you like chemistry you might want to consider studying analytical chemistry, biotechnology, medicinal chemistry, biochemistry, forensic or pharmaceutical science, at the third level.

Before you make any decisions about what course to take, you should find out as much as you can about what it will involve, as length and content vary.



**DEIDRE MURPHY**  
TEAM LEADER, PFIZER IRELAND

"Pfizer are strong advocates for further education. Alongside my job I've been able to complete a part-time Higher Certificate in Biopharmaceutical Engineering and a Higher Diploma in Leadership Development. Pfizer have really supported me and these qualifications have given me new opportunities in my career."

## WHEN SHOULD I SPECIALISE?

**Unspecialised science-based degree courses** offer very broad training in both theory and practical skills, and you can sometimes specialise at a later stage in the degree or even afterwards by following a Masters or PhD programme. It's ideal for individuals who aren't ready to narrow their options.

**A more specialised chemistry-based degree** will offer in-depth training in both theoretical and practical chemistry, and some courses allow students to specialise even further in a particular field of chemistry in the final years of the degree. It provides a thorough foundation, ideal for individuals who already know that they want to pursue a career in the chemical sciences.

Of course, further study options through Master's, PhD or diploma-based courses are available afterwards which can help you to specialise, learn more or support career development in this knowledge-based sector.

# WHICH CHEMISTRY COURSE SHOULD I CHOOSE?

There is no single 'best' course and it's important that you choose the right university and course for you. Choosing a course is only part of the challenge - the university also has to be right for you.

Once you've drawn up a shortlist of courses, make sure you try to visit the universities to get a feel for what living and studying there will be like. While there are plenty of online resources, attending open days is the only way to experience the campus atmosphere, see the facilities and discuss the courses in detail with staff and current students. Remember: you'll be there for a number of years so it's important to make the choice that's best for you.

If you're planning to specialise early make sure you're really interested in the area and the career paths that the subject leads to.

## ACCREDITED COURSES

If you're looking for a degree programme with a lot of chemistry content, check which courses are accredited by the Royal Society of Chemistry. By choosing an accredited degree, you can be confident you're getting a high quality education that will provide you with the right skills for future employment.

[rsc.li/accredited-courses](http://rsc.li/accredited-courses)



**SARAH HUDSON PHD**  
SSPC THEME LEADER AND LECTURER, UNIVERSITY OF LIMERICK

"Going to college, I'd planned to study physics but after the first year of chemistry at 3rd level, I completely changed my mind. Nearly 25 years later, I'm surprised that I still work in chemistry and even more amazed that I lecture to 1st year students now and only hope that they come to appreciate it as I do. To me, chemistry is like a jigsaw or a building set - the elements are the building blocks and the way they come together can create materials with properties that underpin medicine, transport, energy, computing and more, in fact, everything in our lives."

## STUDYING ABROAD

**An exchange programme or industrial placement during your studies is a great way to explore your chosen subject in whole new light.**

Erasmus+ is the EU's flagship education and training programme which enables 250,000 students to study and work abroad each year. It offers the chance to study at an institution in Europe and is a fantastic opportunity to travel, experience a different culture and even improve your skills in a foreign language. You can visit institution websites to find out if they offer an Erasmus Programme as part of their courses.

[eurireland.ie/programmes/erasmusplus](http://eurireland.ie/programmes/erasmusplus)

## INDUSTRIAL PLACEMENTS

**As part of your studies, some institutions offer you the opportunity to work in a pharmaceutical or chemical company on an industrial placement.**

This gives you the chance to improve your lab skills in a professional environment, gain valuable work experience and earn a salary. This is particularly important if you're considering a career in industry as it can be a stepping-stone into a full time job at the placement company. Work placements also play a key role in developing your soft and technical skills and understanding what types of environments you prefer to work in.



# CHEMIST PROFILES



**SHANE FITZGERALD**  
PHD RESEARCHER, DUBLIN CITY UNIVERSITY

"I came into Dublin City University having only studied biology in Leaving Certificate and over the first two years of my Analytical Science undergraduate degree, I gradually picked up chemistry, but it wasn't easy!

My journey through science so far has taken me from a starting point of Leaving Certificate Biology in Dublin; to learning chemistry at Dublin City University; research in analytical biochemistry in Rome; and then to more research in materials science with biophysical chemistry thrown in in my final year! It all came full circle, and convinced me that chemistry was for me as it can be applied to almost every area in life so I'd be sure to find an interesting path to follow - that path being research!"



**CIAN MOLONEY**  
ADVANCED ANALYTICAL MANAGER, GLANBIA IRELAND

"When you think about chemistry your mind doesn't usually jump to food, but, for me, food chemistry is the perfect way to bring theory to life and solve real-world problems! Glanbia Ireland is the largest milk processor in Ireland, producing a wide range of value-added dairy ingredients and consumer products. In Research & Development it's critical that we understand how our ingredients and products behave, so we can ensure they'll always meet our high expectations.

I provide specialised analytical support to the R&D team and wider business, using techniques such as chromatography, electrophoresis, calorimetry and rheology to build scientific knowledge of our range."

**RYAN SIPHO TWANTWA**  
QUALITY CONTROL SCIENTIST, PFIZER IRELAND

"I've always had a keen interest in the sciences from primary school. I wanted to understand and find out how things work, where they come from scientifically. I knew that I wanted to work in a lab but didn't know exactly what. All I knew is I wanted to test and interpret results. I realised that there are so many different jobs involved in chemistry and choosing one was harder than I thought.

I've been privileged to work for some of the biggest pharmaceutical companies (Novartis, Janssen Biologics and now currently Pfizer), all in Cork, and have been exposed to some amazing technology. It's the best choice I ever made for myself to work in chemistry and there are so many opportunities for science people in Ireland.

In conclusion, chemistry is a fun subject and if you have the love for it, and explore your opportunities - the sky's the limit!"



**TREVOR CAREY**  
SENIOR TECHNICAL OFFICER, UNIVERSITY COLLEGE CORK

"I decided to do a PhD at the Centre for Research into Atmospheric Chemistry at the University College Cork. My work in atmospheric chemistry focused on the reaction of green leaf volatiles with ozone. Understanding this reaction is really important for our society as it helps us gain a better understanding of chemical processes in the atmosphere. During my PhD, I got to travel to the European Photoreactor in Valencia, Spain, and the University of York, UK, to collaborate with other researchers. I really enjoyed my PhD - the friends I made in the research group and the many opportunities I got to travel abroad."



# SUPPORT.

## WHERE CAN I FIND OUT MORE?

Find out more about careers in chemistry:

[www.biopharmachemireland.ie](http://www.biopharmachemireland.ie)  
[www.careersportal.ie](http://www.careersportal.ie)  
[www.smartfutures.ie](http://www.smartfutures.ie)  
[www.laboratoryapprenticeships.ie](http://www.laboratoryapprenticeships.ie)

Visit our dedicated chemistry careers website:

[edu.rsc.org/future-in-chemistry/](http://edu.rsc.org/future-in-chemistry/)

Find your local Education Coordinator who can provide advice and support

[edu.rsc.org/our-work/regional-support/education-coordinators](http://edu.rsc.org/our-work/regional-support/education-coordinators)

Find online resources to help you study or teach chemistry

[edu.rsc.org](http://edu.rsc.org)

Learn more about STEM

[scifest.ie](http://scifest.ie)  
[btyoungscientist.com](http://btyoungscientist.com)

Teach Chemistry partnership programme for schools – this free programme will help your school make the most of our activities and resources

[edu.rsc.org/teach-chemistry](http://edu.rsc.org/teach-chemistry)

Course search

[cao.ie/courses.php](http://cao.ie/courses.php)

Quality and Qualifications Ireland

[qqi.ie](http://qqi.ie)

Spectroscopy in a Suitcase programme

[edu.rsc.org/enrichment/spectroscopy-in-a-suitcase](http://edu.rsc.org/enrichment/spectroscopy-in-a-suitcase)

Contact the Royal Society of Chemistry Career Management team if you have any questions about careers in chemistry

[careers@rsc.org](mailto:careers@rsc.org)

Find out more about how our education team can support you

[education@rsc.org](mailto:education@rsc.org)

The Royal Society of Chemistry's purpose is to advance excellence in the chemical sciences – to improve the lives of people around the world now and in the future.

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**VICKY MAC EDIN**

**CHEMIST, HUMAN TOXICOLOGY SECTION  
OF THE STATE LABORATORY**

"I graduated from the Institute of Technology, Sligo, with a BSc (Hons) in Forensic Investigation and Analysis which gave me a love for chemistry that I never knew I had. Chemistry, I've discovered, can open many doors and lead you into many different disciplines."

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[www.rsc.org](http://www.rsc.org)

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