QUEEN'S UNIVERSITY BELFAST

PHYSICS

A PHYSICS DEGREE INFORMED BY WORLD-LEADING RESEARCH

Taught by experts.

A FOCUS ON SCIENCE RELEVANT TO TODAY'S WORLD

Flexible career options and high earning potential.

STATE-OF-THE-ART STUDENT LABORATORIES

Exploring Nobel-prize winning research from quantum to astrophysical scales.

SHAPING A BETTER WORLD
SINCE 1845

PHYSICS

Why study Physics?

Physics is the study of how the universe works, from the smallest atomic nucleus to the largest galaxy. It includes conceptual challenges such as quantum theory, relativity and chaos theory, and lies at the heart of most modern technology – without it, there'd be no laser scanners in the supermarket, no smartphones, and no space flights.

Physicists are critical-thinkers and problem-solvers who are in-demand across a range of industries: you might choose to work in aerospace or physics, or transfer your skills to finance or IT.

From an intellectual point of view, Physics at Queen's is an exciting challenge designed to encourage you to ask the bigger questions that can help unravel the mysteries of the universe.

High-tech audio visual equipment (the invention of which was powered by advancements in physics) may have replaced the humble chalk and blackboard in our classrooms, but the beauty of the subject remains constant.

'Physics allows us to write with a piece of chalk on a blackboard the very structure of the universe and the shape of it. I mean... what's not to love?'

Dara O'Briain

Dr Solveig Felton,
Senior Lecturer

Who will be teaching you?

The Department of Physics and Astronomy has the highest teaching standards and is recognised nationally as being one of the leading centres for research, with 88 per cent of the scientific research carried out by staff deemed internationally excellent or world-leading (REF 2014).

You will be taught by the scientists whose work will be in the next generation of textbooks. This strong link between research and teaching means you'll have the opportunity to explore, apply and understand new scientific advances in real time

Your study options

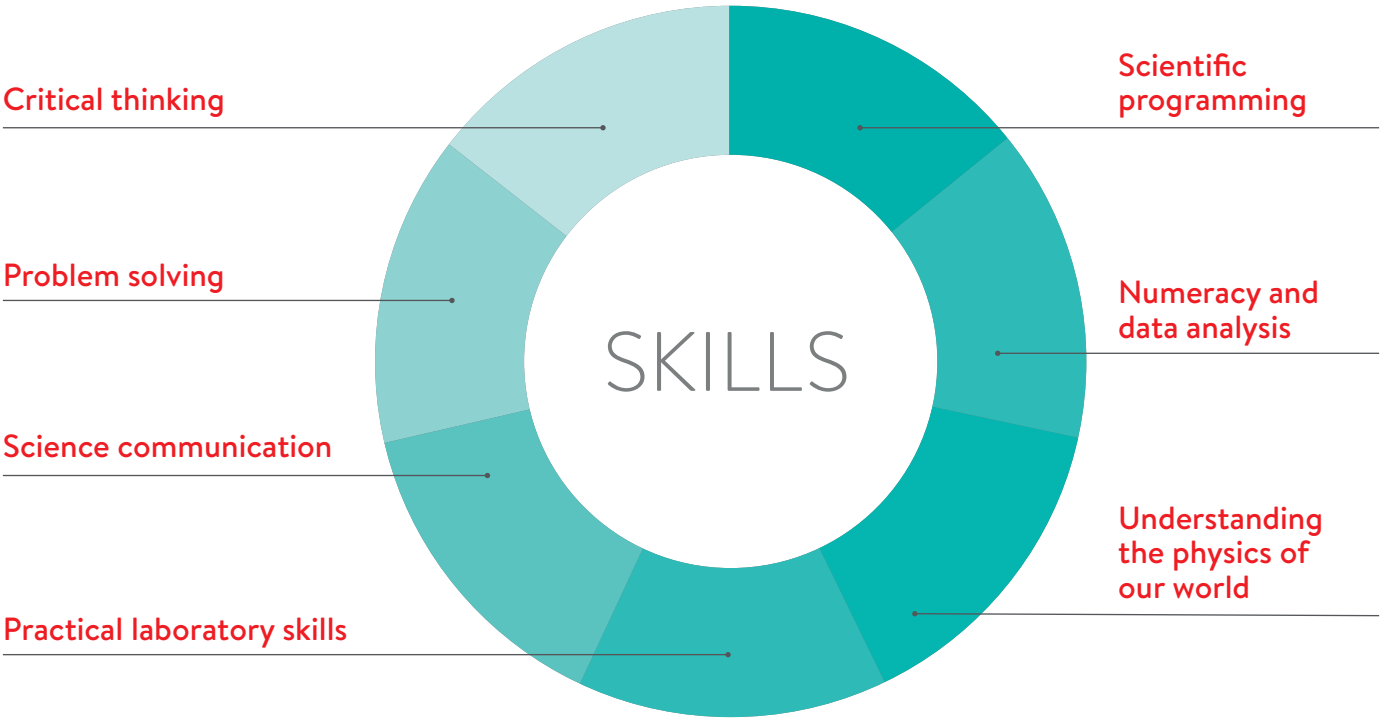
We offer you the choice and flexibility to study Physics as a Single Honours degree or to tailor your studies with a combination of courses (or modules) to suit your individual interests and strengths. For example, you can opt to study Physics with Astrophysics, Physics with Medical Applications, or Theoretical Physics.

In addition, we offer joint degree programmes which allow you to combine Physics with Computer Science or Applied Mathematics, and even to incorporate an extended period of study in Europe, if you also wish to develop your language skills.

This flexibility allows you to keep your career and academic options open until you have had a chance to assess which direction suits you best. Our aim is to give you as much opportunity as possible to develop and fulfil your full potential – whatever direction it takes you.

There are two honours degree structures available: BSc and MSci. The BSc degrees are three-year programmes of study, while the four-year MSci degree programmes are designed for students who intend to practise physics in research and development, in industry or academia at the highest-level. Students who successfully complete Stage 2 have the opportunity to switch from the BSc pathway to the MSci pathway.

WHAT YOU'LL LEARN



Our subject areas

Stage 1: In your first year, you'll study a core of modern Physics and Applied Mathematics, with the option to study a third subject, such as Computer Science. Physics topics include Classical Mechanics, Electromagnetism, Light and Optics, Quantum Theory, Relativity, Solid State Physics and Thermal Physics.

Stage 2: At Stage 2, you'll develop a deeper understanding of the wide applicability of physics, with modules options that reveal the excitement of areas such as Astrophysics I, Atomic and Nuclear Physics, Quantum Physics, Optics, Electricity and Magnetism, Physics of the Solid State

Stage 3: At Stage 3, a choice of modules is made to develop in-depth understanding of areas including Astrophysics II, Advanced Electromagnetism and Optics, Nuclear and Particle Physics, Physics in Medicine, Quantum Mechanics and Relativity and Advanced Solid State Physics.

Stage 4: For those progressing to MSci level, specialist modules broadly reflecting research interests of those teaching in the Department are available. These modules include Cosmology, High-Energy Astrophysics, Laser Physics, Medical Radiation Research Methods, Molecular Physics, Planetary Systems, Plasma Physics, The Physics of Nanomaterials, and Ultrafast Science. Also in this year, a major project is carried out in association with one of these the world-leading research centres, providing an intensive insight into modern scientific research.

Professional Skills: based around the lecture courses, Stage 1 tutorials give experience in problem-solving and verbal and written communication. You'll receive training in writing, presentations and personal/career development. As you progress to Stage 3, you'll have the opportunity to further develop scientific skills such as report writing, presentations and peer-review.

Practical skills: We focus on developing your practical and analytical skills by applying the theoretical knowledge from lecture courses to practical work in well-equipped and modern teaching laboratories. As you progress, advanced laboratory work will develop the skills of planning, carrying out and analysing experiments and simulations. In the higher-levels, project work entails a major experimental or computational investigation of a particular physics problem.

While MSci students have the opportunity to undertake a Computational project module introducing numerical simulations that are fundamental to all areas of physics today.

OUR PEOPLE

I enjoyed having both theoretical and practical experimental aspects of the degree. A sound knowledge of the principles of radiation physics is a requirement for a job as a Clinical Scientist so aspects of my chosen degree were a pre-requisite for my current role. Skills attained as part of a MSci and PhD are directly transferrable to work as a Clinical Scientist in Radiotherapy as our department is very research active with close links to Qnen's.

Denise Irvine:
MSci Applied Mathematics and Physics, now a Consultant Clinical Scientist at Belfast Health and Social Care Trust

My interest had always been in Astronomy since I was very young so studying this at University was the logical next step when I stopped listening to what other people thought I should do and instead thought about what I myself was most interested in. At undergraduate level I enjoyed taking modules in astronomy, especially those in fields I was not as familiar with. I feel like these classes gave me a well-rounded appreciation and understanding of astronomy as a whole, and definitely helped spark some ideas I was then able to apply to my own work.

Andrew McNeill:
MSci Physics with Astrophysics, now a Postdoctoral Scholar studying the shape and rotation of asteroids in our Solar System at Northern Arizona University in Flagstaff, AZ

I knew the job opportunities a degree in maths or physics creates were huge. You learn so much more from a physics degree than equations and numbers. Physics helped me develop so many transferable skills that can be critical in any job, especially problem solving skills. I really enjoyed the professional skills module

Matthew Gilmore:
MSci Physics with Astrophysics, now a Graduate Support Analyst at Highwire Press

Your career prospects

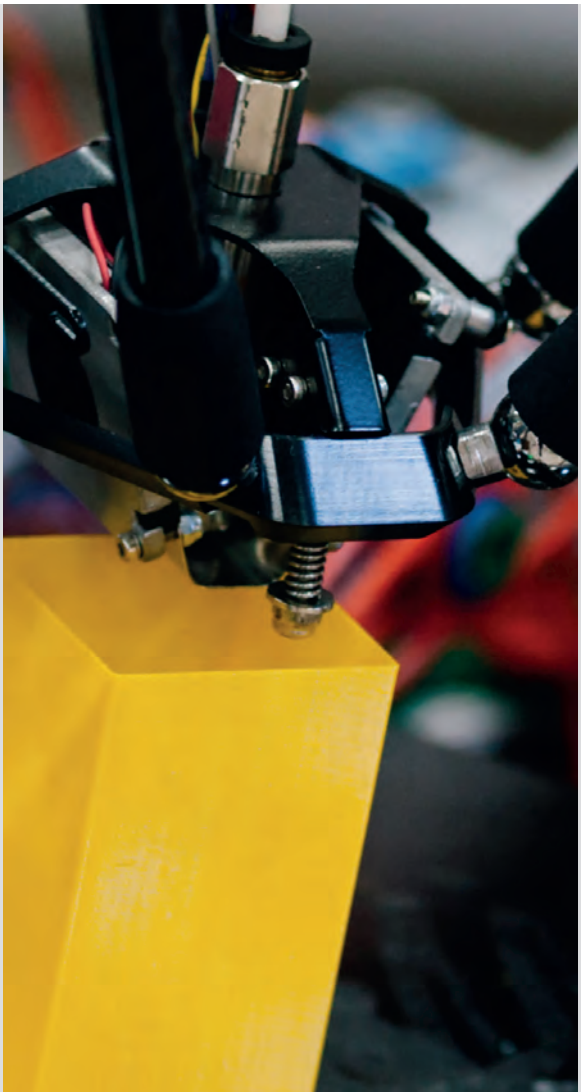
A Physics degree from Queen's opens up opportunities across a range of industries including medicine, biotechnology, electronics, optics, aerospace, computation and nuclear technology, as well as sectors where numeracy skills are highly valued, for example, in finance, business, insurance, taxation and accountancy.

With an ability to understand complex systems, physicists can transfer their skills to a variety of exciting and challenging roles, such as financial forecaster or computer game designer.

Physics graduates earn 14 per cent more on average than other graduates (HESA 2014). They have a significantly lower unemployment rate on qualification and over a lifetime, only graduates in medicine or law earn more than those with a physics degree (Institute of Physics Careers Survey 2012).

About a third of our graduates will go on to postgraduate study. Many physics graduates take up careers in education, while a large number are accepted for a PhD programme in Physics, which can enhance employment prospects or provide a path to a research physicist position.

You could find yourself specialising in a world-changing area of research such as proton therapy to treat cancer or solar energy efficiency in the developing world, or work in research and development for a large energy or telecommunications firm. Armed with a Physics degree, there is a wide variety of career options waiting for you to explore.



OUR RESEARCH

A team of astrophysicists at Queen's were the first to identify the source of gravitational waves sweeping through Earth as coming from the remote collision of two neutron stars. This artist's illustration shows a rippling space-time grid as gravitational waves travel out from the collision and distort space itself. The narrow beams show the bursts of gamma rays that are shot out just seconds after the gravitational waves.

Image credit: NSF/LIGO/Sonoma State University/A. Simonnet

Professor Alan Fitzsimmons from the Astrophysics Research Centre at Queen's and colleagues have decades studying asteroids and comets orbiting our Sun. When the first interstellar object 'Oumuamua was spotted flying past Earth, he and his colleagues Michele Bannister and Wes Fraser at Queen's used the world's most powerful telescopes to perform vital studies. Using their knowledge and the laws of physics, they were able to characterise our first visitor from another star.

"One great thing about teaching at Queen's is how there's such a link between the lectures and current scientific research. My students frequently get to hear about discoveries before anyone else! It's a buzz telling students about quantum physics or cosmology, and wondering if they'll be the scientists one day to unravel the mysteries that still exist in the most fundamental of all the sciences."

Professor Alan Fitzsimmons
Physics and Astronomy at Queen's

"Physics teaching at Queen's is strongly influenced by current research methods and discoveries. Our students see how fundamental concepts link to recent advances such as the discovery of the Higgs boson, or how the detection of gravity waves could be used to probe massive supernova explosions. Coupled with their experimental and computational skills, our students are trained to effectively apply and communicate their knowledge and insight in a range of scientific and other careers."

Dr Jason Greenwood
Physics Director of Education

To discuss your options in more detail or if you have any questions contact:

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FIND OUT MORE ABOUT OUR PHYSICS COURSES:

http://go.qub.ac.uk/physics

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QUEEN'S UNIVERSITY BELFAST

FACULTY OF ENGINEERING AND PHYSICAL SCIENCES