BIOLOGY

Canterbury
ACADEMIC EXCELLENCE AND INSPIRATIONAL TEACHING

Kent is one of the UK’s leading universities, ranked 16th in The Guardian University Guide 2016. In the Research Excellence Framework (REF) 2014, Kent is ranked 17th* for research intensity, outperforming 11 of the 24 Russell Group universities.

World-leading research
The School of Biosciences at Kent ranks among the most active in biological sciences in the UK, with research funding at about £4.5 million per year. Outside bodies have commended the School for its research, which is acknowledged to attain international levels of excellence. In the Research Excellence Framework (REF) 2014, all of our research was judged to be of international quality, and based on our results in the REF, we were ranked 7th in the UK for research intensity in the Times Higher Education.

Research in the School is focused on understanding systems and processes in the living cell. It has a molecular focus and covers the disciplines of biochemistry, microbiology and biomedical science.

Our research feeds directly into our teaching, providing exciting and relevant final-year projects, well-equipped and well-resourced laboratories, and ensures that you learn the most up-to-date science possible. For details, see p5.

Passionate teaching
The School of Biosciences was awarded the maximum score of 24 in its teaching quality assessment, achieving full marks in areas such as the design and delivery of teaching materials, and the support and guidance we give our students. The assessors concluded that the School offers 'well-designed, flexible and coherent degree pathways, taught by dedicated and enthusiastic staff well-matched to the syllabus and clearly informed by industry and research'.

Our reputation for teaching excellence is reflected in the National Student Survey (NSS) results. For example, in 2014, Biology was ranked in the top 10 in the UK for teaching quality, assessment and feedback, organisation and management, and overall satisfaction.

The School also has a reputation for innovation. Two of our academics, Dr Dan Lloyd and Dr Peter Klappa, have recently won National Teaching Fellowship Awards; Dr Lloyd for work on the School’s communication projects (see p21) and Dr Klappa for introducing novel ways of using IT in lectures, which enables the teaching to be captured and easily reviewed later. Dr Klappa has also developed new ways of providing individual feedback to students, and in collaboration with computer graphics experts, has developed high-quality animations to help explain difficult biological concepts that are available on YouTube.

Inspiring topics
Biology is the study of life in all its various forms, from simple viruses to
complex organisms such as human beings. It investigates the structures and functions of living organisms and their interactions with the environment and is at the forefront of social change, playing an important role in our everyday life.

Topical subjects covered at Kent include stem-cell research, synthetic biology, influence of mankind on the environment, and health and disease.

Supportive community
Teaching methods include lectures, lab classes and work in small groups (via tutorials, workshops and problem-solving sessions). We also use some self-learning packages. All students gain extensive practical training and in the final year there is the chance to conduct an eight-week research project which may be laboratory, library, business, computing or communication based.

A global outlook
Kent is known as the UK’s European university and has strong links and partnerships across the world. Thirty-eight per cent of our academics come from outside the UK, which adds an international dimension to your studies and outlook. The School of Biosciences collaborates with research groups throughout the UK and the rest of the world.

Our students have the option to spend a year studying abroad (see p10). This is a great opportunity for personal development and provides an added insight into your subject while experiencing a new cultural environment.

A successful future
In your studies, you gain excellent analytical, communication and numerical skills as well as specialist scientific skills. You have the chance to view science in its wider social context via modules in science communication, business or anthropology. Taking these options can significantly broaden your range of career opportunities (see p8 for more details).

We have excellent links with employers such as GSK, Genzyme, MedImmune and Lonza Biologics, and can offer you a Sandwich Year, which gives you the opportunity to earn a salary for a year, evaluate a potential employer, and enhance your employment prospects. See p15 for details.

Summer Vacation Studentships
We offer Summer Vacation Studentships, giving you the opportunity to apply for a paid eight-week research project in one of the School’s research labs during the summer vacation between your second and final years. Studentships are optional and do not contribute to your final degree result, but provide an ideal opportunity to experience the excitement of research first-hand and to gain valuable skills that will be useful when seeking employment or further study. Our Summer Studentships are funded in part from money given to us by our alumni (The Stacey Fund) and all of our students are eligible to apply.

In addition, the School takes part in a competition organised by the International Genetically Engineered Machine (iGEM) Foundation, where, competing against other universities, undergraduate teams conduct lab-based research in the area of synthetic biology. In each of the last two years, Kent undergraduates have gained a bronze award and in 2014 presented their work at the iGEM conference in Boston, USA.

Professional recognition
All of our Biology degrees are accredited by the Society of Biology, and our four-year Biology with a Sandwich Year programme has Advanced Accreditation (www.societyofbiology.org). Students graduating from Society of Biology recognised courses are eligible for Associate Membership and are entitled to two years’ Associate Membership at half price.

DID YOU KNOW?
In the 2014 National Student Survey, 96% of Kent Biology students were satisfied with the quality of their course.
SUPERB STUDENT EXPERIENCE

Based on a scenic campus, you have the use of modern teaching labs, with state-of-the-art technology.

World-class study facilities
The £1 million bioscience teaching laboratories ensure that our students have an excellent environment in which to develop their practical skills. The School of Biosciences also attracts a large research budget, which allows us to provide excellent research labs. If you choose to do laboratory research as part of your final-year project (see p20), you will work alongside our internationally renowned research scientists, using the same high-level technology.

In 2013/14, over £2 million was spent upgrading the interior of the School and this refurbishment work has now progressed to the outside of the building.

Also on campus are excellent academic facilities, such as the Templeman Library, which provides a wealth of resources with extensive print and electronic collections specifically aimed at supporting the subject areas taught at Kent. To help you work and study online, we provide student PCs and Wi-Fi enabled study hubs across the campus.

Thriving scientific community
The School often collaborates with research groups in industry and academia throughout the UK and Europe. It has excellent links with local employers such as the NHS, GSK, Genzyme, Aesica Pharmaceuticals, Sekisui Diagnostics and Cairn Research.

Beautiful location
Canterbury city centre is only a 25-minute walk or a short bus-ride from the centre of campus. It’s a beautiful city with many stunning medieval buildings and also has lively bars, pubs, restaurants and cafés, and a wide range of shops, from small independent outlets to high street chains.

The attractive coastal town of Whitstable is close by and there are sandy beaches further along the coast. London is under an hour away by train.

A European university
Kent has a diverse cosmopolitan student population with 149 nationalities represented on campus. We have strong links with universities in Europe, and Kent is only around two hours by train from Paris and Brussels.
Sarah Blackburn is in her final year studying Biology with a Sandwich Year.

Why did you choose Kent?
Biosciences at Kent has a very good reputation and I wanted to do a year in industry, which Kent offers. Also, the campus is lovely.

How is the course going?
It is going very well. A biology degree allows you to study a massive range of topics: plants, animals, microbiology, human diseases, so you are not narrowing down your options too early. Also, the course at Kent is very flexible, for instance you pick four optional modules from a choice of 16 modules in your final year, which means that you can tailor your degree to your areas of interest.

Do you have a favourite module?
I enjoy studying immunology, pathogens and microbiology. I am interested in diseases and the immune system and would like to be a research scientist in this area.

I am doing my final-year project on the flu virus and my supervisor is an expert in this field. The flu virus can be found in two completely different forms and we don’t know why. I am looking at a protein called M2 to find out if it can influence the shape of the virus. We don’t know what we will discover and the idea that we could be involved in moving things forward is very exciting. It’s great experience and a fantastic opportunity.

What about the lecturers?
They are friendly, approachable and passionate about their subject, which is inspiring. Many have their own research labs and regularly publish papers, which means that our learning is up to date.

And your fellow students?
Everyone is enthusiastic and motivated to do well. We all help each other rather than compete.

Tell us about your sandwich year?
You apply for placements in your second year and there is a co-ordinator who helps with that. I worked in the Research and Development department at Sekisui Diagnostics in Kent. The company produces enzymes for the global healthcare market and I worked on two enzymes that are necessary for cholesterol tests. I produced data sheets for these enzymes – a data sheet tells a potential buyer everything they need to know about that particular enzyme, for example what inhibits the enzyme and what activates it so they know whether the enzyme is appropriate for their use. The data sheets I created will be published soon which is exciting. I enjoyed my year in industry and would definitely recommend it.

How did it feel to return to university?
It was nice to come back and be a student again; I always wanted to do well in my studies but now I feel even more motivated to do so. My year out has confirmed for me that I do want to work in a lab.

What do you want to do next?
I would ultimately like a career as a research scientist and I hope to do a PhD after my degree.

What about the facilities on campus?
The facilities on campus – both academic and social – are excellent. The library is fantastic, as well as printed publications, there are eBooks that you can download and subscriptions to online journals. There are also study zones all around campus. There are cafés, restaurants, a nightclub, cinema and theatre, and societies for just about everything!

There is lots of support; the careers service is very good; they offer lots of help including mock interviews and an employability award scheme which you can take part in.

What advice would you give to a prospective student?
Decide what you want from a university before you start looking. In my opinion, a biosciences degree is one of the best you can have, as you gain lots of transferable skills. You are not committing to life in a lab, you could go in lots of different directions such as scientific writing or teaching.

I have had a brilliant experience and made the most of the opportunities at Kent – I am a student ambassador, have been a course rep, spent a year in industry and completed a summer project. I think all this experience, alongside my degree, will stand me in good stead for the future.
Many career paths benefit from the numerical, analytical and communication skills that you develop during your studies. Most of our students are highly successful after graduation.

As well as providing a first-rate academic experience, we want you to be in a good position to face the demands of a tough economic environment. In 2014, less than 6% of Kent graduates were without a job or further study opportunity six months after graduation. We pride ourselves on helping students develop transferable skills through their studies.

Common career paths

In recent years, about half (45-50%) of our students go in to work after graduation. Many find employment in commercial, government and hospital laboratories. Typical specialisms include biotechnology, molecular biology, pathology, pharmacology, microbiology and ecology. Others go on to non-laboratory scientific work (eg scientific publishing, science writing, event management, and science communication) and the remainder go on to work in a wide range of non-scientific careers using the transferable skills gained as part of their studies. In recent years, this group of students has found employment in teaching, marketing, sales, banking, accountancy, the police force and social work.

The other half (about 45%) of our graduates go on to further study. The most common route is to take an MSc in a more specialised area or a PhD by joining an established research group. These students often become senior research scientists later in their careers, a role that allows them to work at the cutting edge of scientific exploration. Many of our students choose to stay at Kent to study for an MSc or PhD. We offer several taught MSc options including Infectious Diseases, Cancer Biology, Reproductive Medicine, Drug Design, and Biotechnology and Bioengineering, as well as MScs and PhDs by research.

Professional experience

Students who choose to take a Sandwich Year (see p15) often find this extra experience enhances their job prospects. They gain work experience and an insight into the professional pathways available. A Year Abroad can also provide a valuable experience and an opportunity for personal development. See p10 for details.

A large number of our students also develop professional skills and gain hands-on experience through Kent’s wide range of voluntary work opportunities (see www.kent.ac.uk/employability). We also offer Summer Vacation Studentships, which are paid positions in the School available during the summer after your second year (see p3 for details).

Careers advice

The award-winning Careers and Employability Service can give you guidance in areas such as: how to choose your future career; how to apply for jobs; how to write a good CV; and how to perform well in interviews and aptitude tests. It also provides up-to-date information on graduate opportunities, before and after you graduate. For more details, go to www.kent.ac.uk/employability.

“Collaboration and communication is a gigantic part of the bioscience field, and understanding how to do this effectively has always been an advantage for whatever I’ve chosen to go into. I feel the scientists at Kent prepared me very well for this.”

Danielle Zelli
Biology graduate, now working at the American Museum of Natural History in New York
Kate Nicholls graduated with a BSc in Biology in 2013. She is now working in the NHS.

What attracted you to Kent and to this particular programme?
Kent attracted me first due to its location, very different to home, its beautiful city and an amazing campus. I attended an Open Day and loved the School of Biosciences; the Biology course was just what I was looking for.

How were your studies?
I thoroughly enjoyed my time at Kent. It was at times a challenge but I wouldn’t expect anything else.

What did you think of the teaching at Kent?
The lecturers are fantastic! It makes a huge difference being taught by such passionate individuals. They are approachable both in and out of the lecture theatre, which is great, especially if there is a topic that you are struggling with. They listen to the students, which is important, and are willing to go the extra mile.

Was the course flexible enough to allow you to pursue your own passions?
The Biology course covers a wide range of topics and in your final year you can specialise in certain areas. I chose human biology modules, as I knew that was where I wanted to develop my career. However, I could have chosen modules in biological anthropology, which also looked very interesting.

How do you think your course has changed you?
The course, particularly my final-year project, prepared me for the working world by strengthening skills such as timekeeping, organisation and self-judgement. Over the three years, you find yourself maturing as the intensity of the course increases; come graduation you are ready to begin your career.

What about the facilities?
Kent has very impressive facilities. The teaching laboratories are modern and well equipped. I was lucky enough to spend some time working in the research laboratories using a very advanced microscope to look at nanoparticles. There are also numerous cafés and restaurants and the open space is great when the weather warms up (and for a snowball fight!).

How did you enjoy your time at Kent in general?
I made some life-long friends during my time at Kent and have wonderful memories. I joined the Kent Dance Society, competing against other universities and putting on annual shows, and would recommend joining a society or sport to anyone.

What careers advice did you receive at Kent?
Kent is well known for its careers advice. The Careers and Employability Service will go through your CV with you and discuss your options. My School also held sessions to inform us about career paths after a biosciences degree.

However, I would recommend to students that they also look into it themselves so that they are aware of what is available.

In what way has your degree helped you find work?
After graduating, I worked as a microbiology technician to gain some more laboratory experience. I believe it was the knowledge gained through my studies and the skills I developed in the laboratory at Kent that helped me get that job. I now work in the NHS and do a mixture of clinical lab work, data and patient contact. My job is varied and I love that. In the future, I plan to transfer my skills and work in clinical trials.

What advice would you give to prospective students?
When applying for a degree, it is okay not to know what career path you want to take. Over the years, you will discover which areas of the degree you prefer. When you do graduate, you will be up against other people with degrees and it will be the experience you have gained that will make you stand out. Whether that is being part of a society, taking a sandwich placement or gaining work experience during your holidays – you need to be able to show that you have a range of skills.

Going to university is firstly about attaining a degree but it is also about living. Make the most of your time studying at Kent. Meet people, join societies, visit local areas – enjoy it!
Not sure which degree programme to choose? Here’s a quick guide to the degrees on offer within the School of Biosciences.

**Biology**
Biology is the study of living organisms and their interactions with the environment. The degree is studied over three years full-time, and you investigate a wide variety of life forms ranging from viruses and bacteria to complex animals and plants. The degree provides a broad survey of the various biological disciplines but with a focus on modern molecular techniques. It includes cell and molecular biology, evolution, genetics, infection and immunity, microbiology, anthropology, conservation and the physiology of animals and plants.

**Biology with a Sandwich Year**
This is a four-year programme with a paid work placement (Sandwich Year) between the second and final year of study. This can be in the UK or abroad. Recently, students have studied in Germany, the Netherlands and Thailand. It is available to students who have a good level of achievement at Stage 1 (an overall average of 65% is required; see p16 for more details on eligibility).

For international students, holding a student visa entitles you to work in the UK as long as you are still registered as a full-time student. Since the Sandwich Year is a fully registered part of your degree, this can provide an opportunity for international students to gain a year’s work experience in the UK.

**Biology with a Year Abroad**
This four-year programme allows you to spend a year abroad between the second and final year of your degree – giving you a fantastic opportunity to immerse yourself in another culture. As for the Sandwich Year option, this programme is available to students who achieve an overall average of 65% at Stage 1 (see p16 for more details on eligibility).

All our year abroad exchanges are with universities where the teaching is in English, so you do not need a foreign language qualification to take this option. Currently we have exchanges with 17 universities, including universities in Australia, Canada (4), Hong Kong, Malaysia, Turkey and the USA (8). The
subjects you study during your year abroad will complement your programme at Kent and the extra year allows you to study a wider range of topics than is possible on a three-year degree programme.

**Biology with a Professional Year**

There are an increasing number of opportunities for students to acquire professional training in non-scientific areas (e.g., management). This four-year programme allows you to spend a year away from the University between your second and final year to take full advantage of such an opportunity. This programme does not have a separate UCAS code, but you can transfer into it (if a suitable placement is found) during your second year.

**Other degree programmes**

The following degrees are also available within the School of Biosciences, with options to study abroad or take a sandwich/professional year.

**Biomedical Science**

Biomedical Science at Kent explores the biochemical processes that occur in the human body, and human diseases like cancer and the body’s response to infection. It offers graduates a chance to put scientific knowledge into practical use within medical health care, in laboratory-based fields within the NHS, the pharmaceutical industry or medical research. All our Biomedical Science programmes are accredited by the Institute of Biomedical Science (www.ibms.org) and the Society of Biology (www.societyofbiology.org), which provides support for a wide range of career opportunities.

**Biochemistry**

Biochemistry deals with the way living organisms function at the molecular level. How do living organisms work? How are they built, controlled, repaired and supplied with energy? Biochemistry is an excellent degree if you want to enter a research career in a life sciences area. All our biochemistry programmes are accredited by the Society of Biology (www.societyofbiology.org).

**Bioengineering**

This is a cross-disciplinary course between the Schools of Biosciences and Engineering and Digital Arts. The programme is designed to train the next generation of engineers who will be required to build increasingly complex and integrated systems for medical, commercial and research use. Approximately 30% of the programme is provided by the School of Biosciences.

**International students**

If you are applying from outside the UK and without the necessary English language qualifications for direct entry into the first year of an undergraduate degree, you may be able to take the Kent International Foundation Programme. We have a one-year Biosciences strand that leads on to our Biology, Biomedical Science or Biochemistry degrees if the progression criteria are reached.

You also need strong results in your national school-leaving qualifications in biology and, preferably, chemistry, which will be assessed on an individual basis.

For more details, see www.kent.ac.uk/ifp
STUDYING AT STAGE 1

Stage 1 is the first year of your degree programme.

Your modules provide a broad survey of the various biological disciplines, including biochemistry, biodiversity, cell and molecular biology, and human physiology and disease.

Teaching is via lectures, supervisions, meetings with your academic adviser and laboratory classes. Each module involves, on average, 22 hours of lectures and, where appropriate, is supported by practical lab sessions and regular group work.

At Stage 1, you need to reach a satisfactory standard to proceed to the second year. However, no Stage 1 marks are carried forward to your final degree result. Most Stage 1 modules are assessed by 50% coursework and 50% end-of-year examination.

Please note: the module lists below are not fixed as new modules are always in development and choices are updated yearly. Please see www.kent.ac.uk/ug for the most up-to-date information.

All students take the following compulsory modules:
- Biodiversity
- Biological Chemistry A
- Enzymes and Introduction to Metabolism
- Genetics and Evolution
- Human Physiology and Disease
- Introduction to Biochemistry
- Molecular and Cellular Biology
- Skills for Bioscientists.

Modules: Stage 1

Biodiversity
This module introduces the diversity of life, evolution and development of body form in a wide variety of organisms, including prokaryotes, animals and plants.

Biological Chemistry A
The principles of chemistry are an essential foundation for biology. Building up from the atomic level, this module introduces periodicity, functional groups, compounds and chemical bonding, molecular forces, molecular shape and isomerism, and chemical reactions and equilibria, enabling you to understand the importance of organic chemistry in a biological context.

Enzymes and Introduction to Metabolism
The module introduces you to metabolic pathways and the control of metabolism by changes in enzyme activity. It includes the rates of biological processes and the theoretical principles underlying them, the basic structure and function of enzymes and their kinetics. You perform enzyme assays to determine their kinetic properties and also study the key pathways of metabolism in animals and their control mechanisms.
Genetics and Evolution
Covering the basics of Mendelian genetics to the role of DNA, this module explores the historical views on evolution, the action of DNA, population genetics and speciation. You gain an understanding of Mendelian inheritance and the ability to predict the outcomes of mono- and dihybrid crossbreeding, as well as an insight into Darwin’s observations on the role of genetics in evolution.

Human Physiology and Disease
This module begins with an overview of body tissues, organs and organ systems and then looks in detail at some of the physiological systems of the body, including cardiovascular, respiratory, digestive, urinary and immune systems. This module considers both the normal systems and how abnormalities give rise to disease.

Introduction to Biochemistry
This module provides an introduction to biomolecules in living systems. It contrasts the simplicity of the basic building blocks (amino acids, sugars, fatty acids and nucleotides) with the enormous variety and adaptability of the different macromolecules they form (proteins, carbohydrates, lipids and nucleic acids). It highlights the nature of the molecular structure of the macromolecules and their interactions within the cellular environment.

Molecular and Cellular Biology
You are introduced to the major themes and experimental techniques in molecular biology, genetics and eukaryotic cell biology. The module covers basic cell structure, the principles of the cell cycle and cell division, the control of living processes by genetic mechanisms, and techniques for genetic manipulation, such as gene cloning.

Skills for Bioscientists
Subject-based and communication skills are relevant to all the bioscience courses. In this module, you become familiar with practical skills, the analysis and presentation of biological data, and are introduced to some basic mathematical and statistical skills as applied to biological problems. The module also introduces you to the computer network and its applications, and covers essential skills such as note-taking and essay writing.

DID YOU KNOW?
The School of Biosciences is ranked 20th out of 102 UK universities in The Guardian University Guide 2016.
STUDYING AT STAGE 2

Stage 2 is the second year of your degree programme. At this stage, the modules go into greater depth as you develop your knowledge of gene regulation, microbiology, physiology, and human health and disease.

During Stage 2, your marks contribute towards the grading of your final degree.

Please note: the module lists below are not fixed as new modules are always in development and choices are updated yearly. Please see www.kent.ac.uk/ug for the most up-to-date information.

All students take the following compulsory modules:
• Animal Form and Function
• Cell Biology
• Gene Expression and its Control
• Human Physiology and Disease 2
• Infection and Immunity
• Microbial Physiology and Genetics 1
• Plant Physiology and Adaptation
• Skills for Bioscientists 2.

Modules: Stage 2

Animal Form and Function
You study the diversity of animal life throughout evolution, including elements of functional anatomy and physiology, such as circulation and gaseous exchange, the digestive system, the nervous system and reproduction.

Cell Biology
Reviewing the experimental approaches used to investigate the biology of the cell, this module highlights the similarities and differences between cells of complex multicellular organisms and microbial cells. Initially, it considers the functions of the cytoskeleton and cellular compartments such as the nucleus. Later, you examine the mechanisms by which newly synthesised proteins are secreted or shuttled to their appropriate cellular compartments.

Gene Expression and its Control
This module deals with the molecular mechanisms of gene expression and its regulation in prokaryotes and eukaryotes. This involves descriptions of how genetic information flows from DNA to RNA to protein, how this flow is controlled in specific tissues and cells throughout development, and how it is disrupted in cancer cells.

Human Physiology and Disease 2
This module builds on Human Physiology and Disease and covers in detail the remaining physiological systems of the body, namely reproductive, muscular, nervous and endocrine, and associated disorders including infertility, cardiomyopathies, and neurodegenerative diseases such as Alzheimer’s and Parkinson’s disease.

Infection and Immunity
You study the major diseases of infectious origin that colonise human body tissues, covering the principles of epidemiology, and looking at medically important diseases such as the HIV virus and AIDS. You also study the features and functions of immune cells and molecules used in the defence of the body against invading microorganisms.

Microbial Physiology and Genetics 1
This module includes a review of the structure and biosynthesis of bacterial and fungal cells, their key metabolic processes and their quest for food. You also study microbial growth, genome organisation, and the structure and mechanisms of DNA transfer.

Plant Physiology and Adaptation
This module provides a general grounding in plant biology, including form and function, photosynthesis, phytohormones, plant defence and adaptation to the environment.

Skills for Bioscientists 2
In this module, you develop key skills in undertaking and communicating science. Focused around ‘mini-project’ work, you are introduced to new techniques and also planning and designing your own experiments for a short three-day project. You present your work through an oral presentation and a project report. You develop skills in essay writing, report writing and, in addition, there are presentations on careers to help you start thinking about future career options.
If you choose to do a Sandwich Year, it takes place between Stages 2 and 3.

Excellent links with employers
In the past, our students have taken placements with employers such as GSK, MedImmune, Lonza Biologics, Public Health England, Lilly and the NHS. The School has established excellent links with these and many other employers.

Finding a placement
Work placements are advertised nationally or by employers letting the School know directly about the positions they have available.

Students apply by sending in a CV or application form. We guide you through the process, giving you advice on the placements likely to enhance your career prospects, how to write a successful CV and how to hone your interview skills.

Salary and benefits
Students usually work on placement for the entire calendar year. Salary and holiday entitlements vary according to the employer. However, many students find that they earn enough to be able to save some of their income, and this often helps them in their final year of study at Kent. You pay a reduced tuition fee (currently £865) while away from the University on placement.

Study and career benefits
A work placement provides practical experience that can be put to good use in your final year of study. It gives you a sense of how the theory works in practice and improves your skills in many areas. It also allows you to evaluate a particular career path and gain knowledge of the working environment.

In general, the Sandwich Year is very popular with employers, because of the skills you gain in the workplace. If your placement is a success, you may even be offered a job with the same employer after graduation.
Sophie Bennett is a student on the Biology with a Sandwich Year degree; here she tells us about her experiences on her sandwich year.

‘My placement is based at the Wildfowl & Wetlands Trust (WWT) in the Wetland Conservation unit and I love it!

‘The WWT is a conservation NGO that manages ten reserves across the UK and works in many projects abroad to conserve wetland habitats. It also carries out research, predominantly on birds, around the world; it is a complete privilege to work here.

‘My role is quite wide ranging but I spend most of my time managing the Trust’s new biological recording system, using mapping software and analysing species’ trends on our reserves. Part of the work that I have been involved with is bird ringing (this is where ornithologists catch birds, either in nets or with special traps in order to take measurements and individually mark the bird by putting a metal ring on its leg with a unique number). This allows bird migration and behaviour to be monitored. I have been lucky to take part in bird ringing with the Trust at many reserves in order to monitor Whooper and Bewick’s swans (the latter being fitted with GPS collars so we can monitor their migration routes and see if they follow the same routes as proposed wind farms).

‘I have learnt so much working here; how to use different mapping software, biological recording systems and statistical software as well as developing a greater understanding of various reserve management and bird monitoring practices. In addition, I am also learning a lot just from being in a working environment; going to meetings, presenting my work, managing my workload and getting involved with as many different projects as I can.

‘I think my work here is going to be immeasurably useful when I return to university. The placement has confirmed that this really is the area I want to work in. I am even more determined now to work hard at university because I can see the end goal clearly. I also think that the skills I gain from designing and carrying out a research project while I’m here will be useful when I apply to do a PhD in ornithology, which is what I hope to do after leaving Kent.

‘In the future, I would love to work for the WWT; the people here are some of the best in the world at monitoring and researching wild ducks, geese and swans and have literally written the book on some species. They are fantastic to work with, and for, because they are the best at what they do.’
STUDYING AT STAGE 3

Stage 3 is the final year of your degree programme. In addition to your compulsory modules, you complete a research project and have the chance to develop your particular interests.

Please note: the module lists below are not fixed as new modules are always in development and choices are updated yearly. Please see www.kent.ac.uk/ug for the most up-to-date information.

You take the following compulsory modules:
• The Cell Cycle
• Microbial Physiology and Genetics 2
• Research Project (double module).

You also choose four options from:
• Advanced Immunology
• Bioinformatics and Genomics
• Biological Membranes
• Biology and Human Identity
• Cancer Biology
• Cell Signalling
• Climate Change and Conservation
• Comparative Perspectives in Primate Biology
• Evolutionary Genetics and Conservation
• Frontiers in Oncology
• Integrated Endocrinology and Metabolism
• Magnetic Resonance in Biosciences and Medicine
• Neuroscience
• New Enterprise Start-up
• Pathogens and Pathogenicity
• Virology.

Modules: Stage 3

Advanced Immunology
Since the discovery of HIV, great progress has been made in our understanding of the immune system. This module looks at topical aspects of this subject, with emphasis on the regulation of the immune response and dysfunctional immune systems in disease states.

Bioinformatics and Genomics
The past decade has seen a massive increase in protein structure and genome sequence information. This module investigates how modelling can be used to predict protein function and how genetic variants identified in the genome sequences can be analysed for their ability to cause disease. Lectures will teach you the theory and the bioinformatics analyses will be carried out in computer workshops.

“It is exciting knowing that there is groundbreaking scientific research being done in the same building. Doing research for your Dissertation in the same labs as PhD students was extremely rewarding.”

Charlotte Nisbet
Biology graduate

CONTINUED OVERLEAF
Biological Membranes
Cells and subcellular compartments are separated from the external milieu by lipid membranes with protein molecules inserted into the lipid layer. The structure and function of these two components are diverse, ranging from regulatory functions to maintaining the structure of the cell.

Biology and Human Identity
This module explores human evolutionary biology and identity, including socio-cultural aspects of biological science. The module covers topics including the human fossil record, human variation, what makes us human and ecological adaptation. You learn how to assess the assumptions and limitations of biology in the understanding of human behaviour.

Cancer Biology
This module explores the molecular basis of cancer and how this knowledge may be used to develop new therapeutic strategies to tackle the disease in its variety of forms. Topics include the regulation of gene expression, the role of growth factor signalling, cancer stem cells, cell apoptosis, chemo-resistance, cell metastasis, tumour immunology, and targeted cancer therapies and clinical trial design.

The Cell Cycle
The precise regulation of the cell cycle is essential for all life. In this module, you explore how the current understanding of cellular reproduction emerged, with initial lectures describing the important breakthroughs in cell cycle research. You go on to study the key events that occur and how they are regulated by mechanisms conserved from yeast to man.

Cell Signalling
This module explores the diverse mechanisms used by cells to communicate, covering a range of signalling molecules, including hormones and growth factors, the receptors upon which they act and the associated intracellular signalling pathways that lead to a cellular response.

Climate Change and Conservation
This module studies the role that humans have played in climate change since the beginning of the industrial era. The impact of climate change on individual organisms, populations and communities is investigated, with particular emphasis on understanding how species are responding. You explore how conservation biologists are using particular interventions to ameliorate the most harmful effects of climate change, and the social, economic and political ways in which climate change can be mitigated in the future.

Comparative Perspectives in Primate Biology
This module provides theoretical and comparative perspectives essential to the study of biological anthropology. It introduces evolutionary theory, along with Mendelian and population genetics, and comparative primatology.
Evolutionary Genetics and Conservation
Genetics forms the basis of the diversity of life on earth, and is fundamental to biodiversity, speciation, evolutionary ecology, and the successful restoration of endangered species. In this module, you examine the principles of genetics within a context of conservation including the maintenance of genetic diversity in natural, captive and small populations. The application of molecular phylogenetics is explored, including how measurement of evolutionary distinctiveness can aid biologists in priority-setting for conservation.

Frontiers in Oncology
You are introduced to the basic principles of cancer biology and cancer therapy. You learn about the characteristics of cancer and why the development of more effective anti-cancer therapies is so extremely challenging. We discuss a number of recent scientific publications that highlight the relevant and important issues at the frontiers of cancer research today.

Integrated Endocrinology and Metabolism
This module focuses on the endocrine system, one of the two great control systems of the body. In conjunction with the nervous system, these two regulatory systems are responsible for monitoring changes in an animal's internal and external environments and directing the body to make any necessary adjustments to its activities so that it adapts itself to these environmental changes.

Magnetic Resonance in Biosciences and Medicine
This module provides a basic understanding of magnetic resonance as used in NMR and MRI, and how these two techniques have been used in research and medicine. The first section introduces the use of NMR to study proteins, peptides, nucleic acids, carbohydrates, lipids and metabolites, while the second section looks at the use of MRI in imaging, including functional MRI used to study brain activity in patients with stroke, head injury and Alzheimer’s disease, and imaging of the vasculature to look for aneurysms, stenosis and internal bleeding.

Microbial Physiology and Genetics 2
Building upon the second-year module Microbial Physiology and Genetics 1, this advanced-level module focuses on how physiological homeostasis is maintained in the bacterial cell in response to environmental stresses.

Neuroscience
The molecular and cellular basis of the development of the nervous system from a simple sheet of neuro-epithelial cells is discussed, followed by an investigation of the molecules and mechanisms involved in the transmission of signals between nerve cells. Finally, the module explores how the nervous system controls a variety of behaviours, such as learning, memory and sleep.

New Enterprise Start-up
This module examines the characteristics required of a business to succeed and the reasons for business failure. It covers business risks and uncertainties, skills required for business ownership, and sources of advice and support for businesses.

Pathogens and Pathogenicity
You study the molecular basis for microbial pathogenesis in relation to bacterial, viral and fungal pathogens. Topics include host-pathogen interactions, therapeutic strategies, vaccination and the role of viruses in the development of cancer.

Virology
This module surveys the full replication cycle of a broad range of viral families, including newly emerging infectious diseases. The module includes interactive discussions on a number of recent scientific publications that highlight the relevant and important issues in the field of virology today.
YOUR FINAL-YEAR RESEARCH PROJECT

In your final year of study (Stage 3), you complete an eight-week Research Project. You choose a project that interests you from a wide range of options.

You work independently but have regular meetings with a supervisor who guides you through the process and provides advice and support. This supervisor will be an academic whose research interests are related to your topic.

There are three main types of project on offer – a laboratory-based project (including bioinformatics-based projects), a literature and data analysis project (including business projects), or a communication project. If you choose a laboratory-based project, you will often meet and work with other members of your supervisor’s research team and use equipment and facilities in their own research laboratory. These project types are designed to provide a range of skills for future careers and are closely aligned with the expertise of the academic staff.

Currently, our research areas include: cancer biology and cancer therapies, bioprocessing and the development of novel therapeutics, genetic and prion diseases, reproductive medicine, synthetic biology, protein folding and structural biology, the biology of ageing, molecular motors, and bacterial and viral pathogenesis and sensing.

Laboratory-based project
Laboratory projects are offered in all the research areas of the School and involve techniques such as cell culture, gene cloning, PCR, microscopy, spectroscopy, recombinant protein expression, assay development, and so on. You carry out real research of interest to your supervisor and their research group. You have the possibility of seeing or discovering something for the very first time and having your work published in the scientific literature.

Example project titles include:
• Genome organisation in sperm nuclei using a novel analysis system
• Multicoloured imaging of bacterial compartments
• Investigating cellular adaptation to DNA damage
• Novel single-chain antibodies for the treatment of cancer.

Literature and data analysis project
A literature and data analysis project gives you the opportunity to dig deep into the scientific literature to fully understand an area of research including the analysis of published (or in some cases unpublished) data. The topic will be one that is of interest to your supervisor, who will initially direct you to exciting papers and discuss your findings and ideas with you on a regular basis.

Recent student projects include:
• What do telomeres have to do with ageing and disease?
• Mitochondria as therapeutic targets to extend lifespan
• Does influenza virus morphology reflect adaptation to growth in human hosts?
• How different is resistance development to the platinum drugs cisplatin, carboplatin and oxaliplatin in neuroblastoma cells?

In a Business Project, the objective is to produce a five-year business plan for a proposed biotechnology company. Here, you will work with a real scientific idea and think about how it could be commercially exploited.
Communication project

One of the key challenges facing scientists is to make their work interesting, accessible and relevant to the public. A communication project can develop these key skills and broaden your employment opportunities.

Communication projects are offered in a wide range of topics or you can suggest your own. The topic will be a poorly understood or controversial area of bioscience and you not only research the topic and write an up-to-date science report, but also think about how you can explain your findings to a non-scientific audience. Communication students put this into practice by preparing a presentation for a 14-18-year-old audience and choose one other type of media (eg website, video, poster, newspaper article) to develop strategies to communicate complex scientific principles in an engaging way.

Recent student projects include:

- Sleep – a waste of time or an essential behaviour?
- Beyond genetics: how epigenetics controls your life
- Are sugary beverages a threat to global health?
- The evolutionary battle between the human red blood cell and the malaria parasite.

“Supervising final-year project students is one of the most rewarding aspects of working at Kent. It gives the students a real opportunity to get a taste of what research is like and is excellent preparation for future Master’s or PhD study.”

Dr Ian Blomfield
Senior Lecturer in Molecular Microbiology
VISIT THE UNIVERSITY

Come along for an Open Day or an Applicant Day and see what it is like to be a student at Kent.

Open Days
Kent runs Open Days during the summer and autumn. These provide an excellent opportunity for you to discover what it is like to live and study at the University. You can meet academic staff and current students, find out about our courses and attend subject displays, workshops and informal lectures. We also offer tours around the campus to view our sports facilities, the library, and University accommodation. For further information and details of how to book your place, see www.kent.ac.uk/opendays

Applicant Days
If you apply to study at Kent and we offer you a place, you will be sent an invitation to one of our Applicant Days. You can book to attend through your online Kent Applicant Portal. The Applicant Day includes a presentation about the School, a ‘taster’ lecture given by a member of academic staff on their research area, a guided tour of the campus (including University accommodation) and the opportunity to speak with academic staff and current students about your chosen subject. For further information, see www.kent.ac.uk/visit

Informal visits
You are also welcome to make an informal visit to our campuses at any time. The University runs tours of the Canterbury and Medway campuses throughout the year for anyone who is unable to attend an Open Day or Applicant Day. It may also be possible to arrange meetings with academic staff, although we cannot guarantee this. For more details and to book your place, see www.kent.ac.uk/informal

Alternatively, we can provide you with a self-guided tour leaflet, which includes the main points of interest. For more details and to download a self-guided tour, go to www.kent.ac.uk/informal

Scholarships and bursaries
For details of scholarships and bursaries at Kent, please see www.kent.ac.uk/ugfunding

On the web
For the latest school information on studying Biology at Kent, please see www.kent.ac.uk/bio

More information
If you have any further queries on how to choose your degree, our admissions procedures, how to prepare for your studies or would like information about the University of Kent’s facilities and services, please contact us.
T: +44 (0)1227 827272
Freephone (UK only): 0800 975 3777
www.kent.ac.uk
Location
Canterbury

Award
BSc (Hons)

Programme type
Full-time

Degree programme
Single honours
• Biology (C103)
• Biology with a Sandwich Year (C105)
• Biology with a Year Abroad (C106)

Offer levels
Biology (C103): BBB at A level including A level Biology at grade B. GCSE Mathematics at grade C. IB Diploma 34 points (or 15 at HL) overall including Biology 5 at HL or 6 at SL, and Mathematics 4 at HL or SL.

Biology with a Sandwich Year/Year Abroad (C105/C106): ABB at A level including Biology at grade B. GCSE Mathematics at grade C. IB Diploma 34 points (or 16 at HL) overall including Biology 5 at HL or 6 at SL, and Mathematics 4 at HL or SL.

Required subjects
A level Biology at grade B. GCSE Mathematics grade C.

Sandwich Year
Students have the chance to undertake a one-year placement working away from the University between Stages 2 and 3. See p10 and p15 for details.

Year Abroad
Students have the chance to spend a year studying abroad between Stages 2 and 3. See p10 for details.

Transfer from three- to four-year programmes
It is possible to transfer to a four-year programme at the start of Stage 2 if you achieve 65% or more as an overall average in Stage 1 (see p10).

Progression requirements for Sandwich Year and Year Abroad applicants
Applicants who miss the offer requirements for a four-year degree but subsequently accept a discretionary place will be required to achieve 65% or more in Stage 1 to apply for Sandwich or Year Abroad opportunities. If 65% in Stage 1 is not achieved, you will transfer onto the three-year programme at the start of Stage 2.

Professional recognition
All of our Biology degree programmes are accredited by the Society of Biology (www.societyofbiology.org). Our Biology with a Sandwich Year programme has Advanced Accreditation.

Offer levels and entry requirements are subject to change. For the latest course information, including entry requirements, see: www.kent.ac.uk/ug
COME AND VISIT US

To find out more about visiting the University, see our website:
www.kent.ac.uk/visit