What can be more important than the science of life to any intelligent being who has the good fortune to be alive?

Isaac Asimov
Biochemist & Author
Biology is the subject of the 21st century. At Reading we are at the forefront of this flourishing subject; our overall objective is to further understand life and to communicate this biological knowledge so as to inspire and inform successive generations of graduates.

Our 60 full-time academic staff are experts in a wide range of biological science subjects: biomedical science and biomedical engineering researchers advance knowledge which underpins health and welfare development; evolutionary biologists and ecologists enable better understanding of the natural world and how it can be conserved; researchers in applied biology develop new technologies that provide impactful benefits to the wider society.

Our work is carried out on the beautiful Whiteknights campus set in 130 hectares of parkland including the Harris Garden, a mature botanical garden. The University of Reading is a leading institution for the Biological Sciences, providing excellent degree courses and facilities, and it’s an exciting, friendly place to study.

Professor Rob Jackson
Head of the School of Biological Sciences

www.reading.ac.uk/biologicalsciences
Throughout the degree, you have the option to choose specialised modules, so that you can focus on your particular area of interest. When you study with us, you also get hands-on experience. You have the option of immersing yourself in the biomedical engineering sector by doing a one-year placement with one of our industrial partners, and you can get directly involved in our research through summer placements and your final year research project.

Also, we have the Royal Berkshire Hospital close by. The links we have been forging with them provide opportunities for students to gain first-hand experience in communicating with clinicians and to develop insight into working in a clinical environment. I hope these opportunities will inspire students to learn more about important biomedical challenges and to see how they can apply their skills and knowledge gained from our degree to develop cutting-edge biomedical engineering solutions.”

Biomedical engineering applies engineering methods and designs to some of the greatest challenges we face as a society in terms of our health and well-being. The University of Reading is training future biomedical engineers who will develop the next generation of technologies to diagnose diseases earlier, restore lost body functions and improve quality of life for patients and older adults.

Dr Faustina Hwang, Associate Professor of Digital Health, is one of the people working in this exciting nexus between biology and engineering. Faustina uses her knowledge and skills as an engineer to design innovative technologies that support health and well-being. This includes ensuring that technology is usable by everyone, of any age or ability – people’s needs are at the heart of her research.

“I knew when I entered engineering as an undergraduate student that I wanted to pursue a career in a medically-related field. As I progressed, my appreciation grew for the breadth of opportunities that an engineering degree offers for helping to address biomedical challenges.”

Faustina finds it exciting to work creatively and collaboratively on projects where there is clear potential for real-world impact. She passes this enthusiasm on to our undergraduates when she teaches – imparting passion as well as knowledge. Faustina is one of many full-time expert academics bringing specialist knowledge to the cutting-edge content of the Biomedical Engineering course. As a Reading Biomedical Engineering undergraduate, you will have access to this specialised expertise from day one.
AFTER DARWIN
TO THE
GALAPAGOS
AND BEYOND

Following in the footsteps of Darwin, swimming with sea lions and seeing some of the world’s rarest species is truly a once-in-a-lifetime experience.

Memories of the Tropical Biology Field Course, led by Professor of Ecology Mark Fellowes, have stayed with students long after they have graduated.

In previous years, the trips have taken place in Madagascar and Borneo but for the first time last year, the group journeyed to the Ecuadorian Amazon and Galapagos Islands.

Described by UNESCO as a unique ‘living museum and showcase of evolution’, the Galapagos Islands are brimming with marine, animal and bird species.

The Tropical Biology Field Course allows students to appreciate how people are completely transforming the planet.

“It’s difficult to explain just how lucky we are to be able to see species as iconic as anacondas, sloths, river dolphins, marine iguanas, giant tortoises and Darwin’s finches in the space of a couple of weeks,” says Mark.

For the first part of the trip, the group stays in the Amazon spending time with the local community to see how they interact with the wildlife and biodiversity around them.

“The Amazon is a lush tropical rainforest, for me it’s about the birds, but most people love seeing different primates, like spider monkeys, howler monkeys and pygmy marmosets, the smallest true monkey,” Mark says. “We then go from that very wet tropical rainforest and travel to the arid Galapagos. These volcanic islands are laboratories for evolution, with the majority of species found nowhere else on earth, and many differing from island to island.

Last year, we were snorkelling in the ocean, and came across 50 or 60 giant manta rays. Some of us went in to swim with them, it was just an incredible experience. These are the kinds of things you can’t predict will happen, but we’re never disappointed by wildlife on the Tropical Biology Field Course.”

Field work isn’t restricted to the tropics – other field courses at Reading visit sites in the UK, Spain and Sweden and students have worked in places such as Malaysia, South Africa and the Caribbean for their final year projects.

Back in Reading, teaching involves using the biodiverse campus as a field site and outdoor laboratory, with students learning to identify and survey birds, mammals and invertebrates. The campus has prestigious Green Flag status and is home to a large lake, woodlands, meadows and the Harris Garden with foxes, deer, hedgehogs and owls among its inhabitants.

“We don’t just use indoor laboratories for teaching, we believe passionately in getting people outside to see things for themselves,” says Mark.

“If we want to make a difference, to protect what remains of our biodiversity, the first step is to get hands-on and look at things. The lessons learned at Reading set the stage for understanding how to help protect what’s left.”
In their final year, undergraduate students are offered research projects across the breadth of the biological sciences, from Biochemistry to Zoology.

Recent whole organism projects have involved working abroad, for example investigating declining leopard numbers in a small reserve in South Africa and the effects of oil palm plantations on frog diversity in south-east Asia, but most take place in and around Reading.

Highly successful recent projects include mapping the populations of urban hedgehogs, trying to explain the success of the red kite reintroduction programme and the effect of climate change on butterfly abundance.

In molecular biology, students study the range of diseases that are a major cause of human mortality and morbidity, ranging from cardiovascular disease and breast cancer, to muscular dystrophy and bacterial pathogenesis.

More recently projects have been offered in neurophysiology, particularly focusing on brain-computer interfaces and developing replacement limbs.

While these projects are tightly linked to our courses, there are also opportunities for students who are interested in developing experience of educational work or in gaining experience of curation, using the unique opportunities provided by the Cole collection at Reading, and in areas linking the arts and sciences.

Every year the projects change, as projects are linked to research activities within the School. For most students the final year project is a real highlight of their time at Reading, and some even become authors on scientific papers based on their work.
Strolling through campus it could be easy to walk past a much-loved museum, unaware of the treasures which lie behind its doors. For students of the School of Biological Sciences, however, the Cole Museum of Zoology is the jewel in the crown, with many volunteering to care for its precious collections and using it as the focus of their final year projects.

The museum was established in the early 20th century by Francis J. Cole who was Professor of Zoology at the University from 1907 to 1939. It contains 3,500 specimens including complete skeletons of a male Indian elephant, a false killer whale, a 5m reticulated python and a pair of giant spider crabs.

Associate Professor of Zoology, Dr Amanda Callaghan, has been curator of the museum for 11 years and is passionate about its preservation.

"Since I’ve taken over, it’s been my mission to integrate the museum far more in teaching and offer students closer access to the museum," she says. "A lot of students get excited about coming here and using the specimens. In most museums they are behind glass and you can’t access them, so the students really do benefit from it."

Students are encouraged to sign up for volunteer sessions to help run the museum, spending time cataloguing, cleaning bones, researching specimens and taking photographs. They can also train to be tour guides, entertaining visitors from far and wide as well as school groups. Several students have successfully gone on to work for other museums because of the knowledge and experience they have gained.

The Cole Museum runs side by side with certain subjects, especially zoology, and hosts a number of classes including Paleozoology, Birds: diversity/conservation and Animal diversity. A new module is being introduced this year in Natural history collection management and care.

"It will offer insight into the science behind the work our volunteers are already doing, for example training in things like ethics and conservation methods. It will be a lot of fun," says Dr Callaghan.

The museum has strong links with the Horniman Museum in London, the Oxford University Museum of Natural History and The Hunterian in Glasgow. In two years’ time, the Cole Museum will be moved to a new state-of-the-art Health & Life Sciences building on campus, when students will be able to help transfer this fascinating historical collection. More than a hundred years since it was founded, it remains a tremendous source of inspiration to both students and academics.

Zoology graduate Rashmi Mistry undertook her final year research project studying Ichthyosaurus in the collection with her work presented at the Society of Vertebrate Paleontology in Utah in 2016.

Rashmi says: “Working in the Cole Museum has been an amazing experience. I have learned so much and gained a new interest and appreciation for fossils. To have access to such a vast collection has been a unique and wonderful opportunity. I have acquired many new skills from the experience, which I will be able to apply in other workplaces and opportunities in the future.”
I can’t remember when I first decided I wanted to be a scientist. My parents aren’t scientists, but once I got my first microscope as a child, I knew it’s what I wanted to do. As I got older, I only grew more interested in science. I could see it all around me, through nature, the human body and evolution, so pursuing a degree in Biological Sciences was a natural choice for me.

I wanted to learn the most up-to-date science from the people who knew the most about it: I chose to study Biological Sciences at the University of Reading. My lecturers at Reading were world-class researchers, which meant they were passionate about what they were teaching, and knew how to feed my childhood passion.

There was a light bulb moment in my first year that really drove home that I’d made the right decision. I was sitting in a genetics lecture and I saw how such small things could determine an entire life. What I was studying was complex, fast moving, but vitally important.

In my third year, I conducted my research project alongside my lecturers in state-of-the-art labs. Working alongside them transformed how I saw the Department. I went from being a student to a scientist. I really got to put this into practice during a field trip. I spent two weeks in Colombia finding and studying new species of bacteria that live in extreme environments. The first week was spent collaborating with the local university in its labs. I’m still in touch with the people I met there. This sort of project isn’t available at any other university and it was the highlight of my degree. I was happy that the University of Reading gave me control over the modules I studied and the experiences I had. My options were broad, from immunology to medical genetics to virology.

I’ve loved my time at the University, and part of that is the people I’ve met here. The Department is diverse: it’s made up of students studying courses such as Microbiology, Zoology and Biomedical Engineering. We aren’t taught together, even in the first year, but you could guarantee that everyone you met was passionate about what they were doing. They knew what they wanted to study and pursued it from the start of their degree. It also meant I didn’t need to study modules I had no interest in.

I loved my time at Reading so much, I stayed on for a master’s degree as well. I wanted to study the evolution of cancer, a brand new field that tied in well to my interest of evolution. I’m currently investigating the genetic and physical changes cancer cells need to undergo to spread around the human body, which could give us so much insight into the pathology of cancer, leading to new drugs and treatments.

There is a culture of research here that I wouldn’t be able to find anywhere else. If you come here, you’ll get to do exciting things, not just get a degree.
When Luke Forrest attended the University of Reading’s Open Days, he was awakened to the many areas of study in the Biological Sciences. It was Zoology in particular that captured his attention as he saw how it could lead to jobs in conservation, research, pharmaceuticals, veterinary sciences and even consultancy and corporate roles.

Luke chose to study at Reading for a number of reasons. He was aware of the University’s international reputation for research in the natural sciences and he knew that all of the modules were taught by researchers who were passionate about their subject. He was also excited by the prospect of getting involved in research during his dissertation. But there were non-academic reasons too – proximity to his family and friends in London, as well as opportunities to get involved in sport.

In September 2015, Luke started his one-year placement with the Defence Science and Technology Laboratory (Dstl), a government organisation that delivers specialist services in science and technology to the Ministry of Defence and wider government.

“Originally, I hadn’t planned on doing a placement year as I didn’t understand how it would benefit me. However, by my second year, it was evident that the market outside university was very competitive and I could see how a year in industry would give me an advantage over other graduates applying for jobs.”

Luke’s interest in working for Dstl was sparked by the communications sent out by the University’s Placement and Development Team – it was a placement that he could see would not only provide an opportunity for him to develop and grow his skills, but also enable him to apply science to real-world situations.

“Working with operational search dogs, looking at how you can enhance their behaviour and develop new training techniques. It was really exciting to be involved in a project that was helping to progress our national security, particularly when it is in a state of heightened threat.”

During his placement, Luke was visited twice by a member of the Placement and Development Team to make sure he was settling in and to give him the opportunity to demonstrate some of the skills he was learning on the job. Despite not being on campus, Luke felt a constant connection with the University and access to support should he need it.

An industry placement is a chance for students to transition from university life into a career and this couldn’t be more true in Luke’s case: he has been offered a permanent position with Dstl after he graduates.

“It’s a real acknowledgement that the contributions I made to this area of science during my placement have been valued.”
BSc BIOCHEMISTRY

Biochemistry focuses on the molecular basis of life. This degree course teaches you how inanimate, lifeless chemicals combine to produce living organisms. It provides the most detailed account of how we, and all other life forms, function.

You will study microbes, plants and animals, learning how they shape many of the basic principles upon which all life depends. We will teach you how diseases are caused and how disease can be countered.

PRACTICAL EXPERIENCE AND TRANSFERABLE SKILLS

In this highly-practical course, you will experience key techniques including DNA manipulation, isolation of biomolecules, immunoassays, spectroscopy and bioinformatics. You will develop transferable skills such as designing and executing experiments, using statistical programmes for data analysis, communication skills in written work and presentations, and critical reading skills.

WHY READING?

• Biochemistry at Reading gives you more laboratory experience than many other universities.
• Emphasis is placed on you being able to choose, as the course proceeds, the aspects of biochemistry that you find most rewarding.
• We specialise in the biochemistry of diseases such as cancer and coronary heart disease, with the aim of understanding what goes wrong at cell and molecule level and how drugs and other treatments work.
• We are a research-intensive University, which offers you an extensive final year research project in one of our active research laboratories using cutting-edge ideas and equipment.
• This degree is recognised by the Royal Society of Chemistry.

DEGREE COURSES

BSc Biochemistry
BSc Biological Sciences
BEng/MEng Biomedical Engineering
BSc Biomedical Sciences
BSc Ecology and Wildlife Conservation
BSc Microbiology
BSc Zoology
BSc BIOLOGICAL SCIENCES

BSc Biological Sciences covers all aspects of the study of living organisms from micro-organisms, such as viruses and bacteria, to multicellular organisms, such as flowering plants, animals and humans and their interactions.

You can learn about whole organism physiology, communities through ecology and environmental biology and issues in wildlife conservation. It is our broadest and most flexible degree course.

PRACTICAL EXPERIENCE AND TRANSFERABLE SKILLS

We will foster and widen your biological interests and give you a thorough scientific training, enabling you to investigate and understand biology more fully. Research skills are developed throughout but especially through a substantial research project in the final year. You will develop transferable skills including computer literacy, information retrieval, data handling and communication skills.

WHY READING?

• This programme offers an exceptional variety of optional modules, allowing you to personalise your degree – you can experience the whole breadth of biology if you wish or specialise in a particular area such as human biology or ecology and wildlife.
• Our diverse group of academics are internationally recognised for their research, with expertise ranging from biochemistry to zoology.
• Because of the breadth of subjects covered in the School of Biological Sciences at Reading, you will have access to a range of excellent teaching and research facilities.

BEng/MEng BIOMEDICAL ENGINEERING

Biomedical Engineering is the application of engineering methods and designs in healthcare and biology.

You will learn how the brain works, what techniques exist to monitor different tissues in the human body and the science behind them, and how to design devices to rehabilitate injured patients and help the elderly. You should possess a keen understanding of mathematics and an innate curiosity for human physiology.

PRACTICAL EXPERIENCE AND TRANSFERABLE SKILLS

This highly-practical course gives you experience in techniques such as immunofluorescent labelling, microscopy, DNA and protein analysis, EEG recordings, cell culture and aseptic technique, and analytical methods. You will have the opportunity to develop transferable skills that are in high demand in the biomedical sector, such as how to design and execute experiments, work in teams, use statistics and computing to interpret data, and write essays and reports.

WHY READING?

• Alongside our academics, you can undertake original research in the fields of neural engineering, rehabilitation and medical technology.
• Our expert academics specialise in subjects such as electronics, physiology, robotics, genetics and more.
• You can choose from a wide range of optional modules from across the School of Biological Sciences.
• You have the option to do a placement year within the biomedical sector.
**BSc BIOMEDICAL SCIENCES**

Biomedical Sciences is the application of biology-based science to medical use, be it research, health monitoring or treatment. You will learn how the human body functions in both health and disease and how biological research relates to the development of the medical field. You will learn the basic biological systems that underpin all life from a cellular, tissue, organ and whole body perspective. From this fundamental knowledge, we will teach you about the diseases that result when these systems go wrong, as well as the diseases caused by the vast array of infectious organisms that we are exposed to every day.

**WHY READING?**
- You can tailor your degree to your personal interests due to the flexible, modular structure of our course.
- Academics in our Department are internationally recognised for their research in fields including cardiovascular disease, cancer, cell signalling, endocrinology, virology and bacteriology.
- Benefit from our long-standing links with the Royal Berkshire Hospital – some teaching is delivered by practising NHS laboratory scientists who helped develop this course.
- In your final year, you have the opportunity to undertake an 11-week practical research project on topics as diverse as SARS, HIV, influenza, heart disease, breast cancer and obesity.
- This degree is accredited by the Institute of Biomedical Science (IBMS).

**PRACTICAL EXPERIENCE AND TRANSFERABLE SKILLS**

Practical skills are a crucial component of the course. You will gain experience in a wide range of cellular, molecular and biochemical techniques including DNA and protein technology, live cell microscopy and analytical methods. You can develop transferable skills including designing and executing experiments in the laboratory, teamwork, accessing information, interpreting data using statistics and computing, and writing essays, scientific papers and reports.

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**BSc ECOLOGY & WILDLIFE CONSERVATION**

Ecology and Wildlife Conservation are hugely relevant subjects in today’s world, where resources are becoming scarce, the climate is changing, and extinction rates and habitat loss are occurring at unsustainable rates. As an undergraduate at Reading, you will gain fundamental insights into the natural world around us and understand how we can apply these perspectives to some of our most pressing problems.

**WHY READING?**
- Our teaching is strongly research-led – we carry out a large amount of research into wildlife, its ecology and conservation.
- You can take part in genuinely novel research that could lead to publication in peer-reviewed scientific journals.
- We are very experienced in training students for employment as ecologists and conservationists and focus on enhancing your vocational skills and employability.
- As an Ecology and Wildlife Conservation graduate, you will be eligible for membership of the Royal Society of Biology and Chartered Biologist status.

**PRACTICAL EXPERIENCE AND TRANSFERABLE SKILLS**

You will gain considerable field experience both on campus and on field courses in Spain or the tropics, enhancing your basic skills in species identification and the design of ecological experiments in a range of fascinating habitats. You will have the opportunity to develop transferable skills including career management, written and oral communication, information handling, numeracy, problem-solving, teamwork and the methodology of research and scholarship. You can further develop your skill set through a variety of opportunities available outside the curriculum.
BSc ZOOLOGY

Zoology is the science of animals at all levels, from the subcellular through to the ecology of the animal world. It is a fascinating, challenging and diverse subject that includes taxonomy, physiology, genetics, behaviour, evolution, biodiversity and conservation.

WHY READING?

- There’s no shared first year with other subjects, so you will study Zoology from day one.
- Field work is a large and integral component of our modules, thanks to our Whiteknights campus – a beautiful award-winning green space.
- We are home to the Cole Museum of Zoology, a fantastic educational resource run with the help of student volunteers. The Cole Museum has thousands of specimens from the animal kingdom and a new collection of animal fossils.
- You will undertake a final year research project, enabling you to focus on a topic that fascinates you and make a genuine contribution to zoology research. For many students this is the highlight of their degree, as they are able to focus on a topic that fascinates them and make a genuine contribution to zoology research.

PRACTICAL EXPERIENCE AND TRANSFERABLE SKILLS

Our course emphasises a mix of modern molecular laboratory expertise, practical field skills and traditional taxonomy. You will gain expertise in molecular genetics, ecology, animal behaviour, animal identification, surveying and methods of trapping. You will develop transferable skills in career management, communication, presenting, information handling, numeracy, problem-solving, teamwork, designing and executing experiments, and writing essays, scientific papers and reports.

WHY READING?

- There’s no shared first year with other subjects, so you will study Microbiology from day one.
- Field work is a large and integral component of our modules, thanks to our Whiteknights campus – a beautiful award-winning green space.
- We are home to the Cole Museum of Zoology, a fantastic educational resource run with the help of student volunteers. The Cole Museum has thousands of specimens from the animal kingdom and a new collection of animal fossils.
- You will undertake a final year research project, enabling you to focus on a topic that fascinates you and make a genuine contribution to zoology research. For many students this is the highlight of their degree, as they are able to focus on a topic that fascinates them and make a genuine contribution to zoology research.

PRACTICAL EXPERIENCE AND TRANSFERABLE SKILLS

This programme has a strong practical emphasis. You will gain experience in a wide range of techniques such as microbial genetics, DNA technology, aseptic technique, microbial isolation, propagation and identification and biochemistry. You will learn how to design and execute experiments, work in a team, access information, interpret data using statistics and computing, and write essays and reports. These transferable skills will provide you with maximum flexibility for employment in both science and most other non-science job sectors.

WHY READING?

- Our Microbiology section was established at the University of Reading in 1952.
- Academics in our Department are internationally recognised for their research, with particular strengths in virology and bacteriology.
- This course is designed to maximise choice so that you can focus on the aspects of the subject that most interest you, such as Medical Microbiology, Environmental Microbiology or Food Microbiology.
- In your final year, you will have the opportunity to work in a research lab on a project of your choice and take part in an optional Microbiology Field Course to Iceland to examine Arctic microbiology.
- There are opportunities for funded summer studentships within the School.

BSc MICROBIOLOGY

Although microbes are relatively simple organisms, they are one of the most dominant life forms on the planet. Some cause disease, while others are crucial for life.

We have also learned to exploit microbes for our own benefit. You will learn about the diverse world of microbes and their fundamental properties, genetics and physiology.

PRACTICAL EXPERIENCE AND TRANSFERABLE SKILLS

Our course emphasises a mix of modern molecular laboratory expertise, practical field skills and traditional taxonomy. You will gain expertise in molecular genetics, ecology, animal behaviour, animal identification, surveying and methods of trapping. You will develop transferable skills in career management, communication, presenting, information handling, numeracy, problem-solving, teamwork, designing and executing experiments, and writing essays, scientific papers and reports.
Disclaimer
This brochure was issued in 2018 and is aimed at prospective undergraduate students wishing to apply for a place at the University of Reading (the University) and start a course in autumn 2019. The brochure describes in outline the courses and services offered by the School of Biological Sciences at the University. The University makes every effort to ensure that the information provided in the brochure is accurate and up-to-date at the time of going to press (January 2018). However, it may be necessary for the University to make some changes to the information presented in the brochure following publication—for example, where it is necessary to reflect changes in practice or theory in an academic subject as a result of emerging research; or if an accrediting body requires certain course content to be added or removed. To make an informed and up-to-date decision, we recommend that you check www.reading.ac.uk/Ready-to-Study.aspx for up-to-date information.

The University undertakes to take all reasonable steps to provide the services (including the courses) described in this brochure. It does not, however, guarantee the provision of such services. Should industrial action or circumstances beyond the control of the University interfere with its ability to provide the services, the University undertakes to use all reasonable steps to minimise any disruption to the services.

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Modules disclaimer
Sample modules are provided as a taster of some of the modules that may be available on this course. The sample modules listed may be compulsory (core) or optional modules. Information is correct at the time of going to press (January 2018) but the University cannot guarantee that a module appearing in this list will definitely run.

For optional modules, the University cannot guarantee that all optional modules will be available to all students who may wish to take them, although the University will try to ensure that students are able to take optional modules in which they have expressed interest at the appropriate time during their course. Optional modules vary from year to year and entry to them will be at the discretion of the Programme Director.

Some modules are available on more than one course; if you see a sample module under one course and want to know if it is available on another course, contact the relevant department.

Year abroad and placement fees
Some courses include an optional or compulsory year abroad or placement year. During this year you will only pay a partial fee which is currently set at 15% of the normal tuition fee. Check the website for the latest information: www.reading.ac.uk/fee-discount-18