Earth Sciences
Undergraduate Studies
Royal Holloway is one of the UK’s leading research-intensive universities. One of the larger colleges of the University of London, we are strong across the sciences, social sciences, arts and humanities. We were ranked 17th in the UK (118th in the world) by the Times Higher Education World University Rankings 2014-15, which described us as ‘truly world class’.

As an international community, with students from 130 countries, we focus on the support and development of the individual. Our friendly and safe campus, in Surrey, 40 minutes by train from central London, provides a unique environment for university study where students quickly feel at home.

“One of the 16 most beautiful universities in the world” (Daily Telegraph).

Visit us

Our College and departmental Open Days offer you a unique opportunity to come and find out more about us and get a taste of what university life is really like. Parents and friends are very welcome to come with you. To find out dates and register to attend please visit our website: royalholloway.ac.uk/opendays
Welcome to Earth Sciences

Studying Earth Sciences at Royal Holloway will see you working in an intellectually challenging setting, but one that is also extremely friendly and supportive. Here, you will work closely every day with leading experts in geoscience research.

You will also be taught at a number of exciting and stimulating field sites in the UK, Europe or beyond. Add to this the atmosphere at Royal Holloway, with its well-equipped campus in peaceful surroundings close to the global city of London, and you have all the ingredients for success studying Earth Sciences.

But don’t take my word for it! A visit to the Department of Earth Sciences will certainly help convince you of this. We look forward to meeting you at one of our Open Days held throughout the year.

Professor Peter Burgess
Head of Department

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MORE INFORMATION
This brochure is designed to complement Royal Holloway’s Undergraduate Prospectus and information on the department’s website at royalholloway.ac.uk/earthsciences
It is also available as a PDF at royalholloway.ac.uk/studyhere
Why study Earth Sciences?

Earth Sciences brings together aspects of physics, chemistry, biology, geography, and mathematics to understand the planet we live on, how it came into being and how it may change in the future.

Earth Science serves society by providing us with the understanding necessary to locate and utilise natural resources responsibly and sustainably. The principles of Earth Sciences are not only vital to understand our own environment but provide the starting points from which we can go on to explore the origin and evolution of other planets. In an ever-evolving Earth, understanding the history of all earth materials has never been more important. Knowledge is an integral part of being human, and to understand all that surrounds us is exciting.

Earth Sciences at Royal Holloway

The Department of Earth Sciences is internationally recognised for excellent teaching and research, offering an ideal environment for students to engage with all areas of this fascinating subject. Staff are leading authorities in their field and, together with state-of-the-art facilities, we provide students with every opportunity to succeed in their chosen career.

TOP 10 DEPARTMENT – highly ranked in major league tables, including
6th place in the Guardian 2015, 10th place in the Complete University Guide 2016 and in the World Top 100 (2015 QS World University Rankings by Subject.)

LEADING RESEARCH – the Department is ranked 2nd in the UK for its world-leading and internationally excellent research (REF2014), with particular expertise in global environmental change, petroleum geology and fault dynamics.

HIGHLY SATISFIED STUDENTS – Ranked 7th in the UK, our students gave an overall satisfaction rating of 95% in the most recent National Student Survey (NSS 2015). Students have open-door access to all staff and are allocated a personal adviser to help guide them in their studies.

EXCELLENT CAREER OPPORTUNITIES: our students gain a University of London degree, a qualification recognised the world over. All degrees are accredited by the Geological Society towards Chartered Geologist Status and we hold regular networking opportunities with companies recruiting for geological jobs. 90% of our graduates go on to work or further study within six months (Unistats 2014).
Degree programmes

Degree programmes cater for all interests across the spectrum of Earth Sciences and are complemented by an exciting fieldwork programme to help bring the syllabus to life. Our compelling course curriculum is underpinned by our cutting-edge research which means that students are in touch with the very latest developments.

THREE YEAR DEGREES

F600 BSc Geology
A degree that gives a thorough grounding in all aspects of modern Earth Sciences, through research-led teaching bringing graduates to the limits of current knowledge, and an ideal preparation for a wide range of employment both inside and outside the subject area.

F620 BSc Petroleum Geology
This degree is designed to provide a clear and distinctive pathway leading to a set of skills and knowledge appropriate to the petroleum industry. It is ideal preparation for a career in the extractive hydrocarbon industries and combines theory and practice with extensive field work.

F630 BSc Environmental Geology
Environmental Geology is a highly practical subject with a strong focus on problem solving. This degree prepares students with the knowledge and skills required to help shape society’s response to the impacts of natural hazards and of its exploitation of natural resources on the environment.

FOUR YEAR DEGREES

F601 MSci Geoscience
A degree that equips students with a deep knowledge based on current research, and provides them with advanced skills suitable for continuation into the worlds of academic or applied geosciences.

F631 MSci Environmental Geoscience
This degree extends environmental geology students with the provision of intensive practical and fieldwork during the fourth year, equipping them for the worlds of applied and academic research or employment in environmental geosciences.

F601/FP42 International Year option
As part of either of our MSci programmes, students can elect to spend a year abroad (Canada, USA, Australia or New Zealand), placing them in new, challenging learning environments and cultures.

Industrial Year option
F603: As part of our BSc or MSci programmes, students can elect to spend a vocational year with one of our industrial partners.

Admissions and entry requirements

We welcome applications from prospective students from a diverse range of backgrounds on the basis of attainment at A-level or equivalent qualifications.

Prospective students are encouraged to visit the Department, talk to members of staff and students and find out more about studying at Royal Holloway at one of our Open Days.

TYPICAL OFFERS
• No previous qualifications in Geology are required, although a science background is encouraged
• A2 Subjects: normally three subjects including, ideally, one from the following list: geography, physics, maths, chemistry, biology or geology.
• Please check our website for usual entry requirements and alternative qualifications. Mature applicants are also encouraged to apply.

Applications are considered on an individual basis. Please contact the Admissions Tutor (admissions@es.rhul.ac.uk) for further details.

DEFERRED ENTRY
Applications from candidates who wish to take a year off between leaving school and entering university are accepted. If we offer you a place, and you meet the conditions of the offer, your entry into the Department the following year is guaranteed.

Royal Holloway has a comprehensive admissions policy which sets out how your application will be dealt with. For further information visit royalholloway.ac.uk/admissionspolicy
Degree structure

F600 BSc Geology and F601 MSci Geoscience (F602 with a year of International Study)

**Year 1**
- Global Tectonics
- Sedimentology
- Environmental Issues OR Introduction to Petroleum Geology
- Igneous and Metamorphic Geology
- Mathematics for Geology
- Earth Structures
- Physics and Chemistry of the Earth
- Palaeontology

**Year 2**
- Stratigraphy and the History of Life
- Regional Geology
- Igneous and Metamorphic Geology
- Geochemistry
- Applied Geophysics
- Structural Analysis and Remote Sensing
- Applied Geology (optional 9–12 month industrial placement)
- Field Methods in Geology

**Year 3**
- Advanced Concepts and Techniques in Geology
- Independent Geological Field Mapping
- Applied Geology (optional 9–12 month industrial placement)
- Plus four options (see below)

- (For F602 students, only the Independent Field Mapping is compulsory. Other options are chosen at the university abroad)

**Year 4 (F601 and F602 only)**
- Independent Geoscience Project
- Plus three options (see below)

F620 BSc Petroleum Geology

**Year 1**
- Global Tectonics
- Sedimentology
- Introduction to Petroleum Geology
- Igneous and Metamorphic Geology
- Mathematics for Geology
- Earth structures
- Physics and Chemistry of the Earth
- Palaeontology

**Year 2**
- Stratigraphy and the History of Life
- Regional Geology
- Igneous and Metamorphic Geology
- Geochemistry
- Applied Geophysics
- Structural Analysis and Remote Sensing
- Field Methods in Geology

**Year 3**
- Advanced Concepts and Techniques in Geology
- Mapping Sedimentary Basins
- Advanced Topics in Sedimentology
- Advanced Techniques in Tectonic and Structural Interpretation
- The Geology of Petroleum

F630 BSc Environmental Geology and F631 MSci Environmental Geoscience

**Year 1**
- Global Tectonics
- Sedimentology
- Environmental Issues
- Igneous and Metamorphic Geology
- Mathematics for Geology
- Earth Structures
- Physics and Chemistry of the Earth
- Palaeontology

**Year 2**
- Stratigraphy and the History of Life
- Regional Geology
- Geohazards
- Geochemistry
- Field Methods in Geology
- Other Geology or Geography options
- Applied Geology (optional 9–12 month industrial placement)

**Year 3**
- Advanced Concepts and Techniques in Geology
- GIS and Remote Sensing
- Environmental Geoscience Report (F631 only)
- Methods of Environmental Investigation
- Environmental Geology Project (F630 only)
- Applied Geology (optional 9–12 month industrial placement)
- Plus three options (see below)

**Year 4 (F631 only)**
- Independent Environmental Geoscience Project
- Environmental Field Investigations
- Plus five options (see below)

**Year 4 options**

<table>
<thead>
<tr>
<th>Course name</th>
<th>Degree programme</th>
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<tr>
<td>Seismic Processing and Interpretation</td>
<td>F600 F601 F630 F631</td>
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<tr>
<td>Modern Climates</td>
<td>F600 F601 F630 F631</td>
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<tr>
<td>Geodynamics and Plate Tectonics</td>
<td>F600 F601 F630 F631</td>
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<tr>
<td>Reservoir Characterisation</td>
<td>F600 F601 F630 F631</td>
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<td>Water Quality</td>
<td>F600 F601 F630 F631</td>
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<td>Air Pollution</td>
<td>F600 F601 F630 F631</td>
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<td>Interpretation of Structural Settings</td>
<td>F600 F601 F630 F631</td>
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<tr>
<td>Terrestrial Palaeocology</td>
<td>F600 F601 F630 F631</td>
</tr>
<tr>
<td>Oceans and Atmospheres</td>
<td>F600 F601 F630 F631</td>
</tr>
<tr>
<td>Advanced Igneous Petrogenesis</td>
<td>F600 F601 F630 F631</td>
</tr>
<tr>
<td>Earth Surface processes</td>
<td>F600 F601 F630 F631</td>
</tr>
<tr>
<td>Palaeoclimates</td>
<td>F600 F601 F630 F631</td>
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<tr>
<td>Contaminated Land</td>
<td>F600 F601 F630 F631</td>
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**Year 3 options**

- Advanced Topics in Sedimentology
- GIS and Remote Sensing
- Volcanology
- Advanced Techniques in Tectonic and Structural Interpretation
- Mineral Resources
- Advanced Palaeontology
- Aqueous Geology
- Planetary Geology and Geophysics
- Marine Geology

**Degree programme**

- F600 BSc Geology
- F601 MSci Geoscience
- F602 with a year of International Study
- F620 BSc Petroleum Geology
- F630 BSc Environmental Geology
- F631 MSci Environmental Geoscience
- F631 only
Teaching and assessment

100% of students said:
• Courses are intellectually stimulating
• Staff made the subject interesting,
• Staff are enthusiastic about what they’re teaching
(NSS 2014)

Our teaching programme emphasises the interconnectedness of the Earth System, while allowing students to focus in greater detail in a range of key areas that interest them.

First and second year core courses consider the Earth as a dynamic system, the interaction between physical and chemical processes acting at and below the surface, the environment and the evolution of life. In the final year(s), students go on to broaden and deepen their knowledge by choosing from a wide range of advanced options that reflect the research strengths and interests of the Department. Independent project work and fieldwork form a prominent part of all the degree courses.

As in any science degree programme, lectures primarily define the learning agenda, and knowledge and understanding are supplemented through private reading and research. Learning materials such as lecture notes, presentations, quizzes and interactive exercises are all made available to students online through a Virtual Learning Environment. There is also a strong practical element and the acquisition of key practical skills is developed through exercises in the classroom, laboratory and field.

All of the courses are assessed and the marks from the assessments after the first year will count towards the final degree classification. Styles of assessment vary according to the nature of the course and include:
• written exam papers held during the Summer Term
• (for a typical lecture-based course the exams may count
• for 60 percent of the total assessment)
• practical classes carried out in the classroom, laboratory or field
• written reports on selected topics
• individual, independent projects which may be laboratory or field based (for example field mapping)
• presentations based on team or individual exercises

“...Courses are intellectually stimulating, Staff made the subject interesting, Staff are enthusiastic about what they’re teaching...”

(NSS 2014)

“I have found my time at Royal Holloway enjoyable and rewarding. The Department has a positive, open-door attitude that encourages personal growth and understanding. The level of feedback and support allows you to excel academically. The Lyell Society, for earth science students, provides numerous social events which make you feel a part of the Department from the first pizza night!”

Jacob Longridge, 2nd Year BSc Geology
Fieldwork and Study Abroad/Industrial Year

Fieldwork is regarded as an important part of a geologist’s training and the modern geologist must have knowledge and skills that can be used internationally. The Department organises a variety of trips, both in the UK and abroad, lasting from one day to several weeks.

The fieldwork programme emphasises techniques and provides training in the field interpretation of stratigraphy, sedimentology, tectonics and igneous processes. Mapping courses include a number of small projects and a major field mapping exercise is conducted in the third term of the second year.

Local trips have included:
- Southwest England
- Pembrokeshire
- Mull
- Skye
- North Somerset
- Lake District
- South Devon

International trips have included:
- Almeria, Spain
- Cyprus
- Digne, France
- Florida
- USA
- Pyrenees, Spain
- Tenerife
- Iceland

Students are normally resident at the overseas institution for two semesters. In addition to academic and pastoral support at the overseas institution, a Royal Holloway Earth Sciences tutor will maintain regular contact with students while they are abroad. To ensure eligibility, students must maintain high standards of performance during the first two years of their degree.

Some of our exchange universities:
- Duke University, North Carolina
- McGill University, Montreal
- University of Alberta
- University of California
- University of Western Australia
- Victoria University, Wellington
- University of Arizona, Tucson
- University of Sydney, Australia
- University of Canterbury, Christchurch

Students are normally resident at the overseas institution for two semesters. In addition to academic and pastoral support at the overseas institution, a Royal Holloway Earth Sciences tutor will maintain regular contact with students while they are abroad. To ensure eligibility, students must maintain high standards of performance during the first two years of their degree.
The Department

FACILITIES
The Department of Earth Sciences has a vast array of specialist equipment supporting teaching and research into atmospheric sciences, geochemistry, geophysics, mineralisation, magmatism, sedimentology, stratigraphy, structural geology, palaeobiology, and volcanology.

Lectures and practicals take place in well-equipped lecture theatres and teaching laboratories within the department and our third and fourth years students undertake research projects in many of the research laboratories. These include laboratories for measuring stable and radiogenic isotopes, mineral identification and trace elemental analyses. There are fully equipped sedimentological and palaeontological laboratories as well as two analogue modelling laboratories for scaled structural modelling projects. We have a large 2D and 3D seismic database generously donated by our industrial sponsors and this is used for both undergraduate and postgraduate training and research.

Major computing and workstation facilities underpin many aspects of our research and provide the basis for international communications. The department is fully networked with teaching and research computer laboratories, as well as a large seismic interpretation workstation laboratory. We have Mac and PC workstations for student and staff use and students are offered training in all of these facilities.

Students have access to many library resources including electronic journals, use of the libraries on campus as well as in central London, including the British Library and Senate House Library.

STUDENT WELFARE AND SUPPORT
When you join us, you are immediately assigned to a member of staff who is your Personal Adviser who will help you choose your courses and offer personal support during your degree, referring you to the wider range of College welfare services where necessary. Department staff are renowned for being friendly and approachable.

The College has excellent provision for supporting students through their studies and we are committed to supporting students with disabilities or special educational needs.

OUR RESEARCH
All of our teaching staff are actively involved in research and have published many books and articles in specialist or popular science journals. Undergraduate students experience the importance of being in a very strong research environment in two ways:

- The material taught in lectures and practical work is not recycled from text books but is presented by experts in the field who can teach students about the very latest advances in the subject, sometimes before it is widely published.
- The independent project work that students carry out in their third and fourth years can involve participation in research programmes which are at the cutting-edge of the science, providing excellent first-hand training for those who wish to pursue a career in the geosciences.

The Lyell Geoscience Society

Sir Charles Lyell (1797–1875), was one of the founders of modern geology and the first Professor of geology at King’s College London, one of our founding constituent departments. The Lyell Society is organised by undergraduate students under guidance of postgraduate students and a member of staff. It coordinates a number of events throughout the academic year.

Bi-weekly guest lectures are held in the department during term time on a wide range of cutting edge topics; these culminate in the annual Lyell Symposium during which talks are given by internationally-recognised specialists from industry as well as visiting academics. The student-organised field trip is a particular highlight of the year and has visited locations such as Snowdonia and the Isle of Wight. In addition a range of social events takes place throughout the academic year ensuring a friendly social atmosphere between students of all years and members of staff.

SIR CHARLES LYELL
1797–1875
HERE ARE JUST SOME EXAMPLES OF ACTIVITIES HELD:
- Courtyard barbecues
- Halloween party
- Pizza quiz nights
- Annual Lyell Symposium and black tie dinner
- Ceilidh and whisky tasting

RESEARCH TOPICS CURRENTLY UNDERWAY IN THE DEPARTMENT INCLUDE:
- mapping the geology of remote tropical regions in Southeast Asia
- creating 3D models of subduction zones
- use of lead isotopes to understand formation of oceanic crust
- the impact of glacial unloading on Icelandic volcanism
- climatic variation as a fundamental control on sediment supply to basins
- ancient wildfires and the shaping of ecosystems and evolutionary changes
- analysis of mantle-derived rocks
- the origin of gold deposits in Europe
- Cenozoic biogeography of the West Pacific
- numerical modelling of stratigraphic successions

Please see our website for more details.
Your future career

A degree in Earth Sciences leads to a diversity of career opportunities – mostly in industry and the private sector, but also in universities and the public sector. Geologists have a role to play in global exploration for whatever raw materials we need – water, minerals, oil and gas.

Geologists understand the environment and can provide answers to global problems like climate change and waste disposal. The Department’s graduates have gone on to work in a wide variety of areas, such as oil and gas industries, water authorities, environmental agencies, media organisations and news agencies, banking, insurance and consultancy.

GRADUATE DESTINATIONS
Our graduates have gone to work for well known employers such as: BG Group, BHP Billiton, Environment Agency, Oxford University Press, Thames Water, Shell.

They undertake a wide variety of roles, as illustrated in the graphic below.

The highly varied degree structure and specialities of the academic staff in the department also encourages many students to continue with further study of the earth and pursue an MSc and/or PhD programme.

INTERNSHIPS AND INDUSTRY LINKS
Many of our students undertake internships which helps prepare them to move into the career of their choice upon graduation.

Recent internships have included:
• Research experiences at the University of Kiel in Germany
• Work experience at a gold and silver mining company in Eastern Kazakhstan

For further information, please visit royalholloway.ac.uk/earthsciences/awards

FURTHER GEOLOGY TRAINING – 32%
MSc Petroleum Geology
MSc Environmental Geology
MSc Engineering Geology
MSc Mining Geology
PhD Research Programmes

OIL, GAS & MINING – 11%
Exploration Geologist
Seismic Interpreter
Reservoir Geologist
Mining Geologist
Geophysicist

TEACHER TRAINING – 5%

NON-GEOLGY – 43%
Communications Officer
Financial Consultant
Software Developer
Credit Risk Analyst
Royal Air Force
Web Designer
Consultant
Fund Raiser
Town Planner
Journalist

ENVIRONMENTAL – 8%
Environmental Officer
Environmental Engineer & Consultant

OTHER GEOLOGY CAREERS – 1%
Geographic Analyst
Map Editor

oil, gas & mining – 11%
exploration geologist
seismic interpreter
reservoir geologist
mining geologist
geophysicist
CAREERS SUPPORT

Employers are interested in the skills students develop through student life as well as the academic knowledge gained through studies. The department partners with the College Careers Service to provide opportunities for students to develop transferrable skills and market themselves effectively for graduate jobs.

The Careers Service is part of The Careers Group, University of London, the largest university careers service in Europe. Our students benefit from one-to-one advice from a Careers Consultant, access to a wide range of facilities and part-time jobs fairs attended by local employers, as well as a wide variety of skills workshops throughout the academic year.

We endeavour to help students to recognise their own strengths, skills and abilities so that they can make strong applications for their chosen job or training course. Advice on careers – including CV writing, completing application forms and preparing for an interview.

Industry representatives regularly make recruitment visits to the Department, providing opportunities for current students in the job market.

GRADUATE PROFILE

Alumna: Helayna Wade
Subject: BSc in Geology
Graduated: 2014
Place of Work: Geotechnical Engineer at Bam Ritchies, London

“Studying Geology at Royal Holloway isn’t just a university course – it launched my career and was the best time of my life.”

The course covers a wide range of fascinating topics from paleontology to volcanoes, but the emphasis is on putting your knowledge into practice. It taught me how to solve problems under pressure and how work as part of a team, skills extremely relevant for the workplace.

What particularly impressed me about the Earth Science department is its strong community ethos. Staff are really friendly and have an ‘open door policy’ so if you ever have a problem, they are always there to help.

Since graduating, I’ve become a Geotechnical Engineer. This has taken me all over the UK, and I’ve been involved in a range of projects including constructing tunnels for London’s Crossrail Project, repairing dams in Snowdonia, and remediating old mine sites in Kent.

Studying Geology at Royal Holloway was the start of all that – and the course exceeded my expectations in every way!”