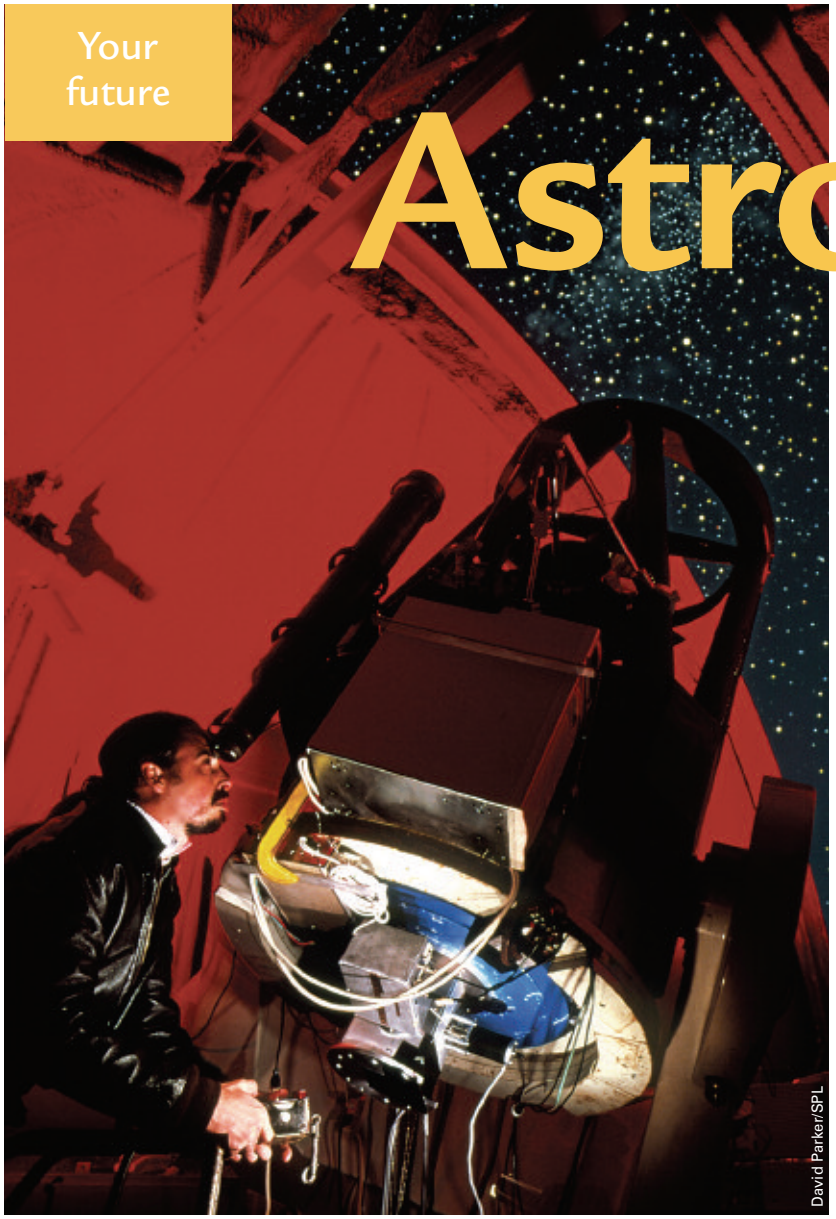
Your future

Astronomy



Above: *Astronomer using an optical reflecting telescope at the Leuschner observatory near San Francisco in the USA*

Astronomy appeals to many young people, but there are several different courses available. Here we take a look at what astronomers do all day — and all night.

The UK is a world leader in astronomy, and has been for three centuries. Today, British scientists lead the field in many aspects of observational and theoretical astronomy and cosmology. Many universities have important departments of astronomy, and several British observatories are famous around the world — think of Greenwich, Jodrell Bank, Edinburgh and Armagh.

Astronomy is a cooperative affair and there are a lot of shared facilities around the world. So, as an astronomer, you might find yourself working alongside people of many different nationalities at an observatory high up on one of the Canary Isles or in Chile's Atacama Desert.

Telescopes scan the skies gathering radiation in all parts of the electromagnetic spectrum — from radio waves to X-rays and gamma rays. Other instruments detect high-energy particles arriving from space, known as cosmic rays.

Box 1 Rocket science

Astronomers observe space, using ground-based telescopes as well as instruments on board spacecraft. They may also be involved in planning, making and testing the instrumentation and spacecraft before their launch.

The UK has a great reputation for devising and building instrumentation for all types of astronomical observation. The Astronomy Technology Centre is based at the Royal Observatory in Edinburgh. Computing has a big part to play, too. Most observations are now recorded electronically, and the vast quantities of data can only be analysed by computer.

What about making spacecraft? EADS Astrium is a European company concerned with building spacecraft. It has three sites in the UK, and has contributed to many of the European Space Agency's missions.

Key astronomy terms

There are many different strands in astronomy — perhaps you have wondered what some of the following terms mean?

Astronomy

This is a general term. Astronomers make observations of whatever is of interest in space — planets, moons, stars, galaxies, black holes, quasars — and try to explain what they see.

Astrophysics

Astrophysics is more to do with studying the stars — what they are made of, their life cycles and so on. There is a strong link with chemistry here, since most of the elements in the universe were formed in stars.

Cosmology

This is concerned with the big picture. What is the history of the universe? How is it structured? How will it all end?

Space science

Space science is harder to define. Space scientists are concerned with our exploration of space, and how our knowledge can be used. They are interested in visiting other planets and their moons, and the use of satellites to tell us more about our own planet, the Earth (see Box 1).

The first colour picture from Huygens *of the surface of Saturn's moon, Titan*

Getty Images

Jack Guez/AFP/Getty Images

John Zarnecki, the principal investigator of the surface science package of the Huygens *mission at a press conference of the European Space Agency presenting the results of the Titan mission*

Box 2 Astrology

Though astrology is an old belief system there is no scientific evidence to support it and astrologers do not usually have scientific training. For some people, it has proved a good way of making a fortune out of other people's desire to believe pseudo-science.

Courses to look out for

Many universities offer courses in astronomy or astrophysics. Often these are joint courses with physics, which give you the chance to include different proportions of astronomy modules in your course. Many include the opportunity to study abroad for a year.

Traditionally, these courses lead to a BSc degree. However, there are also many MPhys (Master in Physics) degree courses. MPhys courses are at the same level as a BSC, but last 4 years and allow you to study at a deeper level, with more specialisation. It is usually possible to switch between these courses in your first year of study.

Physics and maths are generally required at A-level. Chemistry is useful for astrophysics.

Box 3 Places to visit

Astronomers are always happy to discuss their subject, and you will usually find an enthusiast if you visit a planetarium (www.planetaria.org.uk). Many observatories have open days (and open evenings for looking at the night sky) — we have featured some visitor centres in earlier issues of CATALYST.

The Monument in the City of London was designed by Robert Hooke and Christopher Wren, both architects and scientists. Essentially, the Monument is a hollow cylinder, 202 feet tall, which could be used as an 'azimuthal telescope'. An astronomer at the foot of the tube could observe and time the passage of stars directly overhead.

Find out more from the useful booklet *Physics on Course*. This lists all physics and astronomy courses in the UK and is available free from the Institute of Physics (e-mail: **education@iop.org**).

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Astrology is a belief system that argues that the positions of the stars and planets at the time of someone's birth determine aspects of their life (see Box 2).

• Take a trip to the Monument in the City of London. It was built to commemorate the Great Fire of 1666 — and is a telescope (see Box 3).

Answers to Chemdoku, page 19

H	Li	B	C	He	O	Be	N	F
C	Be	He	Li	N	F	B	O	H
N	F	O	H	B	Be	He	Li	C
He	B	F	Be	Li	C	N	H	O
O	H	Li	B	F	N	C	Be	He
Be	C	N	O	H	He	Li	F	B
Li	O	C	F	Be	B	H	He	N
F	N	Be	He	C	H	O	B	Li
B	He	H	N	O	Li	F	C	Be