

Biomechanical and rehabilitation engineering

Join the team and make a difference

Healthcare scientists working in these areas of clinical engineering combine expertise in biology and physics to develop instruments, devices and groundbreaking techniques – such as keyhole and robotic surgery – to transform patients' lives for the better.

What will you do?

In **biomechanical engineering**, you will apply specialist knowledge to study the mechanical aspects of the body and increase understanding of its systems and functions. This includes investigating the flow of fluids and the absorption of chemicals in the body, muscle action and skeletal movement.

You may be involved in creating complex artificial joints, synthetic valves for hearts, cardiac-assistive devices and other devices that replace or improve a failing body part. You may also make measurements of the movements of patients with movement disorders such as cerebral palsy and spina bifida to help surgeons, rehabilitation doctors and physiotherapists make treatment decisions.

A career in **rehabilitation engineering** may require you to develop, modify and research mechanical and electronic assistive devices to improve the lives of patients with physical and mental impairments.

You will design custom-made equipment, or modify existing devices (such as wheelchairs, artificial limbs and electronic communication aids), to help with movement, sitting, communication and daily living. This is likely



to involve working closely with prosthetists and orthotists, who design artificial limbs and supportive braces and splints and footwear, as well as directly with patients and their physiotherapists, occupational therapists and doctors.

These specialist areas overlap and often depend on one another. Both roles involve plenty of patient contact and you will need to develop trusting relationships to understand the needs of those you are assessing and treating.

Caring for patients with complex long-term conditions like stroke or dementia must be carefully managed by the community team. Healthcare scientists specialising in this area are important as they provide appropriate

equipment to improve a patient's dignity and independence in their home.

Biomechanical and rehabilitation engineering will be rewarding careers for healthcare scientists who want to use their expertise to improve patients' lives on a practical, day-to-day level.

What entry routes are available?

To qualify as a clinical engineering technologist, you will need to take a vocational BSc degree in clinical technology, which includes an element of on-the-job training. On completion of your training you will be eligible to join the voluntary register of clinical technologists.

Clinical engineers specialising in biomechanical and rehabilitation engineering initially need an honours degree in a physical or engineering science. With a first-class or upper second-class degree in a relevant subject, you will be eligible to join the NHS Clinical Scientists Training Scheme. This is a four year programme consisting of two years covering a range of subject areas, followed by two years of specialist training, during which you will be paid while

undertaking the clinical elements of your training. Some employers may also pay your tuition fees and offer financial support while you undertake theoretical academic elements of your training. This will usually lead to an MSc or specialist postgraduate diploma, and give you the opportunity to work at the forefront of research and knowledge as a clinical scientist registered with the Health Professions Council. For more information, visit

www.nhsclinicalscientists.info

With GCSEs or an equivalent NVQ and/or previous work experience it is often possible to start work as a trainee or assistant in healthcare science, combining on-the-job training with study so that you learn as you earn. For more information, see the *Clinical support worker* factsheet.

You will need to develop trusting relationships with those you are assessing and treating

Where will you work?	What skills and qualities will you need?
You could be based in a hospital department supporting all clinical units that need clinical engineering intervention, or in a rehabilitation unit, working as part of a team with medical staff. Your workplace may be linked to a medical physics department that carries out research and development.	• ability to work well in a team – there's plenty of contact with medical, administrative and clinical staff as well as occupational therapists, physiotherapists, prosthetists and orthotists
	• basic business acumen – you will need to deal with equipment manufacturers
	• strong interest in science and innovation
	• sympathetic, professional manner – you'll be dealing with patients daily, some of whom may be in great discomfort and/or have disabilities
	• desire to carry out research and make developments in your field
	• willingness to keep learning throughout your career



Some employers also offer cadet schemes, which involve a two-year training programme that gives you experience of different jobs within healthcare science.

For more information on the range of opportunities available in healthcare science, please visit www.nhscareers.nhs.uk/list/qualifications. This gives more specific details about what qualifications are necessary for each role. You can search for current vacancies and download job descriptions at www.jobs.nhs.uk

How can you develop your career?

This is a career with excellent prospects, and includes openings for research, management

and education – in fact, you will be encouraged to study, perhaps for an MSc or PhD.

You will be expected to continually expand your knowledge as advances are made and you may carry out related specialised work.

With training, responsibility and experience, you could reach the highest level in the profession, attaining consultant status, at which level you are likely to be in charge of a large department or making a significant contribution to your area of expertise.

To find out more about what training is available in this area, please visit www.nhscareers.nhs.uk/list/training

As well as moving to more senior and specialised roles within this area, you will also have the chance to take on additional clinical, teaching, research and management responsibilities within the organisation as part of the Career Framework. For more information about this initiative, please see the *Careers in healthcare science* booklet.

Pay

The national pay system in the NHS is called Agenda for Change (AfC). This applies to all healthcare science staff except the most senior managers. These are examples of roles and the AfC bands at which they may be paid: healthcare science support worker (Band 2); healthcare science assistant (Band 4); healthcare science practitioner (Band 5); healthcare science specialist (Band 6); healthcare science advanced (Band 7); healthcare science consultant (Band 8a-9).

For more information, visit

www.nhscareers.nhs.uk/list/payandbenefits

To find out more about this area of healthcare science, please visit
www.nhscareers.nhs.uk/list/working

For more information on the professional bodies relevant to healthcare science, please visit
www.nhscareers.nhs.uk/list/contacts

