

# Making a difference



## Physics and Engineering Careers in Medicine and Biology

A career in medicine doesn't just mean becoming a doctor. Physicists, engineers and technologists play important roles in research, diagnosis and treatment by applying science to make a difference to people's lives.

# Medical Physicist

**Name:** Davinder Shirgill, Clinical Scientist  
**Location:** University Hospitals Birmingham  
**Qualifications:** BSc (Hons) Physics

## I got into this career because...

I always knew I wanted to combine problem-solving and helping people so during my physics degree I searched for jobs that would allow me to do both. As soon as I saw the Scientist Training Programme (STP) I knew it was the only thing I was interested in applying for. I did some work experience by making contacts at several different hospitals. In my third year I opted for all the medical physics modules I could, steered my third year project in that direction, and went to open days about the STP. I was pretty thrilled when I got onto the scheme.

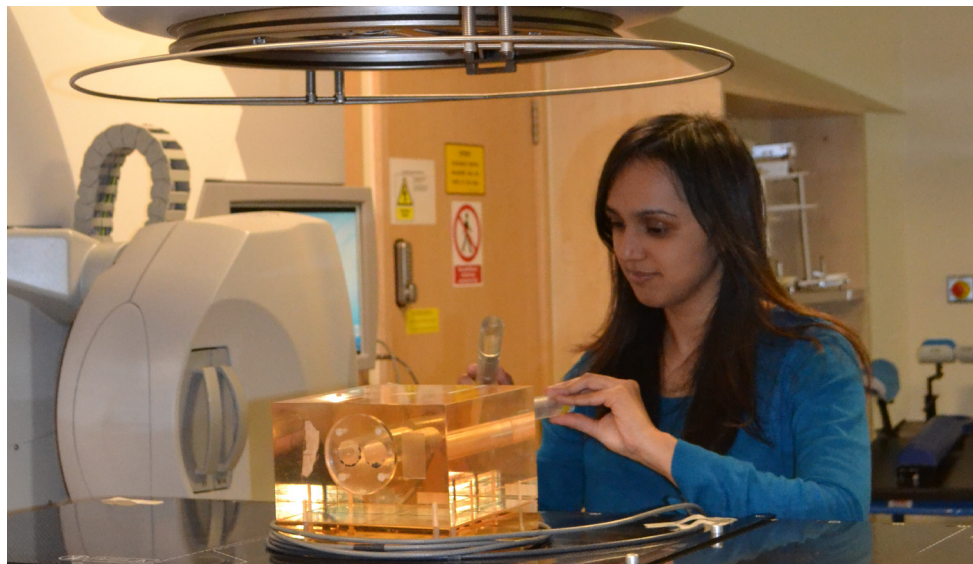
**“I like knowing that what I do helps the public and that problems I encounter are solved by systematic scientific methods.”**

## My job...

is a mix of routine and project work. Routinely, I'm involved in planning radiotherapy treatments and doing checks on our radiotherapy machines, ensuring we always know the dose the patient is getting. I'm also involved in introducing new techniques such as using magnetic resonance imaging (MRI) rather than computed tomography (CT) images to plan treatments – potentially getting better quality images and improving treatments in the long term.

## I like...

knowing that what I do helps the public and that problems I encounter are solved by systematic scientific methods. This profession is very broad and people can very easily find areas where they become the national specialist – something to aim for!



# Apprentice

**Name:** Andre Hall  
**Location:** King's College Hospital London  
**Qualifications:** GCSEs

## I got into this career because...

I was always interested in engineering but didn't actually do much science at school. After a year at college I left as I realised that my style of learning was hands-on. I did a number of different jobs but when I found this apprenticeship on the Government website it looked right for me. After a 2 week course and an interview I started my 18 month apprenticeship.

## My job...

involves spending several months in different departments such as A&E, renal technology, nuclear medicine etc. My current placement is in the clinical equipment room. Here we check and repair hospital equipment (like heart rate monitors for example) and keep the hospital's database of all the equipment up to date.

## I like...

that it is much more interesting than any other job I have done! Every day is different and I am always learning something new. We have study days and assignments which eventually lead to a Level 3 qualification in Servicing Medical Equipment– all whilst being paid. At the end of my apprenticeship I will hopefully be offered a job in one of the departments I worked in or I can do further training. For me this is a great stepping stone into a long term career.

**“This is much more interesting than any other job I have done!”**





## Working in universities

**Name:** Dr Alejandra Aranceta-Garza, Research Associate

**Location:** Department of Biomedical Engineering, University of Strathclyde

**Qualifications:** BSc (Engineering), PhD

### I got into this career because...

I come from a family of medical doctors and I also enjoyed investigating any electronic item I could get my hands on. So biomedical engineering seemed like the perfect match – I was instantly hooked! After an engineering degree I did my PhD in upper-limb prosthetics. In my mind my goal was really clear: I wanted to improve people's quality of life and to be a positive influence.

“I love what I do and I would not change it for the world.”

### My job...

is a mix of different exciting things such as being involved in various research projects which aim to develop technologies that improve people's quality of life. For example, we develop different control mechanisms to make an artificial hand move simply by the action of the muscles from the forearm. Sometimes these new technologies make it to the market, and for everyone involved in the process, this is hugely rewarding.

### I like...

teaching undergraduate Prosthetics & Orthotics and Biomedical Engineering students. To be part of their training, as well as to learn from them, makes me love teaching. And collaborating with different disciplines seeking common goals provides me with enormous satisfaction. I love what I do and I would not change it for the world.



## Technologist

**Name:** Carl Grimsditch, Nuclear Medicine Technologist

**Location:** St Mary's Hospital Manchester

**Qualifications:** MSc (Chemistry)

### I got into this career because...

I have always been interested in science and chose STEM subjects at A-Level and did a chemistry degree. I wasn't really sure what to do but I was sure I didn't want to end up in a job I hated even if it paid me lots of money. So when I saw an advert for a Nuclear Medicine Technologist I knew this would allow me to combine my interest in science with helping people.

### My job...

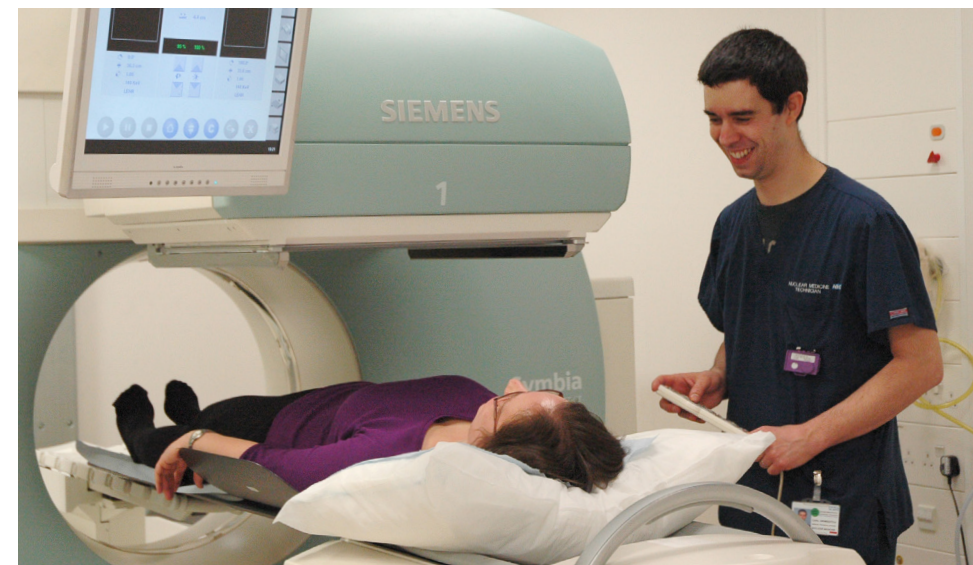
is in the nuclear medicine department of a hospital where we scan patients to diagnose disease. This is done by injecting specific radioactive substances into patients. When we scan the patient with a gamma camera these radioactive substances show up in the target organ and this helps us diagnose cancer and other diseases. Quality control of the cameras and dose calibrators are an essential part of

the work. We also explain the procedures to patients and give them advice on radiation protection. The patients' ages range from babies to the elderly and many are very nervous so talking to them is important.

### I like...

the fact that I am helping people and that my job is so varied – dealing with patients, working in the radiopharmacy, technical aspects of imaging, writing protocols and even doing some teaching, all within an interesting team of doctors, physicists, technicians and other healthcare professionals.

“I enjoy the fact that I am helping people and that my job is so varied.”



## Working in industry

**Name:** Rita Morgado da Silva

**Location:** Elekta Ltd

**Qualifications:** MEng (Mechanical Engineering)

### I got into this career because...

the only certainty I ever had was that I wanted to help people have a better quality of life. At different points of my life I wanted to study something different: biology, genetics, medicine and finally engineering. People are always surprised when they realise that engineering is not only about building bridges or cars but can be applied to medicine and biology. During my degree I had the opportunity to work in the pharmaceutical industry and to perform research in the medical engineering department. These experiences helped me decide what I wanted to do.

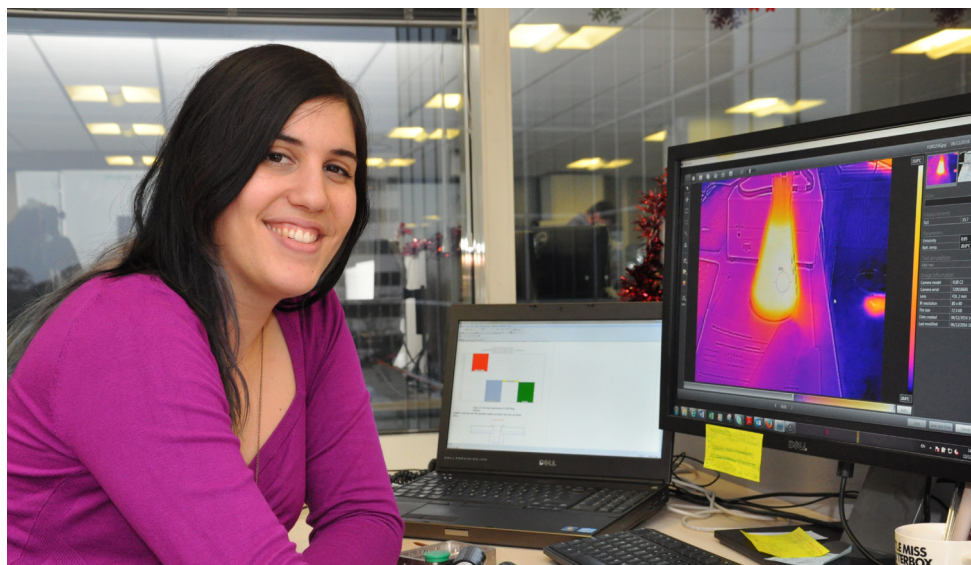
**“It is a wonderful feeling that I am helping to design and build machines that save people’s lives.”**

### My job...

is working in the mechanical systems team in Elekta’s research and development department. The company develops and manufactures radiotherapy machines – complex systems which have at their heart a linear accelerator (linac) capable of producing high energy electrons (for electron therapy) and photons (for x-ray therapy) for the treatment of cancer. A linac integrates advanced software, control, electronics and mechanical systems in a single product.

### I like...

that I am helping to design and build machines that save people’s lives. I also really like the fact that every day I encounter new challenges and I am always learning something new. As an engineer, I believe knowledge and learning is the key to enjoying what I do.



## Clinical Engineer

**Name:** Nathan Robson, Clinical Scientist

**Location:** Milton Keynes Wheelchair Service

**Qualifications:** MEng and MSc (Biomedical Engineering and Clinical Science)

### I got into this career because...

after my A-levels I really wanted to do something which combined my two favourite subjects (biology and physics). I didn’t want to spend my career in a lab or a workshop so started looking for something where I could apply my knowledge and skills to directly impact on people’s lives. A large number of scientists and engineers work in the NHS, often in patient facing roles which is exactly what I wanted to do. Unfortunately my first two applications to the Scientist Training Programme (STP) were unsuccessful, but following some time spent working and doing another MSc in Biomedical Engineering, I got in.

### My training...

was partly hospital based and I specialised in rehabilitation engineering in areas such as clinical gait analysis, assistive technology, wheelchair and specialist seating, design, manufacturing, communication /

environmental aids. Now my job involves carrying out assessments and reviews, prescribing, and issuing and adjusting wheelchairs, specialist seating and other specialist components. I am also responsible for my clinical and administrative team, service development and operational management of my service.

### I like...

that I have a patient facing role. It is extremely rewarding as the work you do directly impacts on the lives of the patients. No two patients are the same, so there are always new challenges.

**“A patient facing role is extremely rewarding as the work you do directly impacts on the lives of the patients.”**



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## Average Salaries

| Industry Sector     | Starting   | Rising to      | Top level        |
|---------------------|--|----------------|------------------|
| Apprentices         | 10k  | –              | –                |
| Technologists       | 22k  | 25k – 40k      | 60k              |
| Clinical Scientists | 32k  | 40k – 60k      | 100k             |
| University          | 34k  | 50k (Lecturer) | 100k (Professor) |
| Industry            | Depends on what level and with what experience you start working |                |                  |

## Further information

- Watch careers videos by clicking on the YouTube icon on our website [www.ipem.ac.uk](http://www.ipem.ac.uk)
- Read about physical sciences and biomedical engineering on [www.healthcareers.nhs.uk](http://www.healthcareers.nhs.uk)
- For modern apprenticeships check out [www.apprenticeships.gov.uk](http://www.apprenticeships.gov.uk)
- Technologists positions are often advertised on [www.jobs.nhs.uk](http://www.jobs.nhs.uk)
- Universities and Colleges Admissions Service for undergraduate and postgraduate courses [www.ucas.com](http://www.ucas.com)

## How to...

### Become an apprentice or clinical technologist

There are several different entry routes into clinical technology. Some hospitals and companies offer structured on-the-job training and apprenticeships at various levels. Check our website for more detailed information.

### Work as a physicist or engineer in medicine and biology

First choose science A-levels and do a degree in physics or engineering. Then there are several options:

- Apply for the NHS Clinical Scientist Training Programme (STP). This programme has several long placements in medical physics or clinical engineering departments of a hospital and leads to an MSc in Clinical Science. There is also an option to do a relevant MSc outside the STP and qualify with further in-work training.
- Work in one of the UK's 3000+ medical devices companies. Some take on graduates and provide further training, others require experience or further degrees.
- Study for a specialist Masters degree or PhD and work in universities or research institutes.

### Become a student or apprentice member of IPEM

Once you are a university student or apprentice you can become an Affiliate or Associate Member of the Institute of Physics and Engineering in Medicine (IPEM) free of charge. See our website [www.ipem.ac.uk](http://www.ipem.ac.uk) for more details.

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