INSIDE

Olympic rowing champion James Cracknell gets his skin off!

Don’t pick your nose! Read our top tips for impressing at interview.

From mobile phone masts to X-ray machines - who protects us from unnecessary radiation?

Personality Test

Could YOU work as a physicist or engineer in a hospital or medical research lab? Take our quick PERSONALITY TEST to find out if you’ve got what it takes....

1. In the future I’d like my job to be
   a) interesting, stimulating and fulfilling
   b) an adrenaline rush every day
   c) as little effort as possible. Ideally I’d like to earn money for doing nothing

2. Which statement best describes you?
   a) I like to help other people whenever I can, particularly if I can see they are less fortunate than myself
   b) I might consider helping other people, but there are plenty of charities that can do a much better job of this than me
   c) I couldn’t care less about other people. All that matters is me

3. How much would you like to earn in the future
   a) a decent enough wage to buy a house, run a car, go abroad for holidays and support a family if I want one
   b) nothing short of millions
   c) I won’t need to worry about money because I’ll be internationally famous by the time I’m 20 and everything I need will be bought for me

4. When I die I’d like to be remembered for
   a) winning a Nobel Prize for inventing a new method of detecting disease that saves millions of lives
   b) being the loudest at parties and generally having a good time
   c) winning ‘Rear of the Year’

If you answered mainly (a)s then read on, as a career in medical physics or medical engineering could be for you.
If you answered mostly (b)s then other careers such as becoming an F1 driver may suit.
If you answered mainly (c)s then it’s time you woke up and realised the Earth revolves around the Sun, not you! How about going out and getting a REAL life? You never know, you might even start to enjoy a hard day’s graft and putting other people before yourself for a change.

Lucy Richley
Radiotherapy Physicist

“My best day at work was when a four year old girl with restricted growth collected the new bike I had designed for her. Smiles like hers are why I do this job.”

Tim Adlam
Medical Design Engineer

“Being part of a team that helps provide accurate, safe treatment for cancer patients gives me great satisfaction.”

Read more about Tim’s work overleaf
“I feel that I’ve managed to find a job that throws up challenges and is achieving something more than just making money.”

Andy Harris, Medical Physicist

Keen sportsman Andy Harris has sailed across the Atlantic twice. As your Gran no doubt tells you, life isn’t all plain sailing (groan!) and Andy also has to work for a living. Luckily as a Medical Physicist Andy can combine his interest in sport with his 9 to 5 whenever he uses nuclear medicine to identify sports injuries.

“Nuclear medicine scans use low levels of radioactive material to give information about the function of different parts of the body. For example, it is possible to look at the heart and decide whether the patient has heart disease, or to look for evidence of cancer,” explains Andy, who works for the Sheffield Teaching Hospitals NHS Foundation Trust.

“We can also see sports injuries because a scan of the skeleton reveals areas where the bone is growing or repairing itself, and will often show small fractures which cannot be seen with other techniques (such as X-rays) which only show the structure. Amongst other things this is useful for showing stress fractures caused by playing sports,” Andy adds.

Another type of scanning - magnetic resonance imaging (MRI) - can also help diagnose injuries in athletes, and allows suitable treatments and training regimes to be adopted. This image of Olympic rowing champion James Cracknell was taken on the latest MRI scanner developed by the manufacturer Siemens.

Machines like this cost thousands of pounds, and are generally used to reveal serious disease and injury, so MRI experts like Vicki Doyle - an MR Product Specialist for Siemens Medical Solutions - help to make sure the systems hospitals buy fulfill their needs. “It’s an extremely varied and interesting job made challenging by the continuous developments in system design and applications,” says Vicki.

No, not really! And no, Tim doesn’t sit on a loo for a living! He’s actually a Medical Design Engineer at Bath Institute of Medical Engineering. Here Tim gives us an insight into his job…

My best day at work was when a four year-old girl with restricted growth collected the new bike that I had designed for her. Smiles like hers are why I do this job. I’ve also designed these toilet handles for children with restricted growth and developed automatic cooker knobs for people with dementia.

Medical engineering is all about designing for people - and people are complex. A big part of my job is understanding the needs of people with disabilities so that I can design technology that will help. It’s no good creating the most amazing system in the world if the person it was designed for can’t use it. I know that my work makes life better for people, and that makes life better for me.
Joanne Young, a Radiation Protection Service Manager at King’s College Hospital NHS Trust tells us about her job…

Jo, you’re a Clinical Technologist, right? Yes, but tell people you work in a hospital and they instantly assume you are a nurse! Very few people have actually heard of Clinical Technologists. I certainly hadn’t back in 1991 when I saw a job advert for a Trainee Technologist in Radiation Protection.

So what’s Radiation Protection all about? Well, it’s very diverse. We work with radiation in many different forms, from X-rays and radioactive substances to lasers, ultraviolet light and radio waves. The main philosophy is to ensure that radiation doses to patients, staff and the public are kept as low as possible.

What do you do all day? Much of my working day involves testing different types of X-ray generating equipment to make sure it is only emitting the amount of radiation it should be. The equipment I test ranges from very basic things like dental X-ray machines to complex CT scanners. X-ray equipment is becoming more and more sophisticated, so it’s a constant challenge to keep up to date with the technology. My job also involves advising people who use radioactive substances how to dispose of them safely once they’ve finished with them, helping provide a monitoring service for staff to check how much radiation they’ve received while they’ve been working with patients and equipment, and teaching on radiation safety courses. Recently people in my profession have also begun to provide environmental monitoring services to measure the emissions from mobile phone masts.

The best bit? As you can see, it’s a very varied job and you could be doing something completely different every day.

What qualifications do you have? An ONC and HNC in Medical Physics and Physiological Medicine, and an MSc in Medical Radiation Physics, but I gained all of these on the job. To get into the profession as a trainee all you need are good A-levels, especially in science subjects.

Any tips for a successful career in radiation protection? You must be very committed, as there is nothing more important than safety.
Jo, Lucy, Andy, Vicki, Barbara, Steve and Tim all qualified a few years ago when training schemes were different to the ones there are now. To get jobs like theirs today, here’s what to do:

**HOW TO: BECOME A CLINICAL TECHNOLOGIST [Clinical Engineering and Clinical Physics]**

**TAKE:** 2 A levels OR a Scottish Higher or Advanced Higher in science or maths (preferably including physics), or vocational qualifications to the same standard, which includes science, engineering or maths.

**THEN TAKE:** a vocational degree in clinical physics technology or clinical engineering technology, either full-time with hospital placements, or part-time whilst working as a clinical technologist in a hospital. The degree must be accredited for the training scheme by IPEM and you must register on the training scheme for clinical technologists. Alternatively, take a science degree and look for routes that involve a post-graduate qualification.

**HOW TO BECOME A MEDICAL PHYSICIST**

**TAKE:** at least 3 A levels, including maths and physics and, preferably, another science and get good grades.

**THEN TAKE:** a honours degree in physics, and aim to get at least a 2:1

**THEN APPLY:** for a place on the Training Scheme for Medical Physicists and Clinical Engineers, which is funded by the Department of Health, where you will:

- **TAKE** an MSc degree in Medical Physics, accredited by IPEM, and
- **RECEIVE** vocational training in a hospital department accredited by IPEM for two years followed by two further years of advanced training.

**Note:** an MPhys or MSci as a first degree will not remove the need for an accredited specialist MSc.

**HOW TO BECOME A CLINICAL ENGINEER**

**TAKE:** at least 3 A levels, including maths and physics and, preferably, another science and get good grades.

**THEN TAKE:** a full honours degree in (preferably) electrical, electronic or mechanical engineering, accredited by the Institution of Electrical Engineers or the Institution of Mechanical Engineers and aim to get at least a 2:1

**THEN APPLY:** for a place on the Training Scheme for Medical Physicists and Clinical Engineers, which is funded by the Department of Health, where you will:

- **TAKE** an MSc degree in Biomedical Engineering or Clinical Engineering, accredited by IPEM, and
- **RECEIVE** vocational training in a hospital department accredited by IPEM for two years followed by two further years of advanced training.

**Note:** an MEng as a first degree will not remove the need for an accredited specialist MSc.

**What is a Nuclear Medicine Clinical Technologist?**

Barbara Dawson from the Medical Physics Department at Rotherham General Hospital explains

Nuclear medicine uses radioactive materials to treat and diagnose disease, and Nuclear Medicine Clinical Technologists like myself carry out a range of nuclear medicine procedures including therapy treatments and imaging with gamma cameras (see below). We also analyse body fluids such as blood after a radiopharmaceutical has been administered.

Clinical technologists work with the latest equipment as part of a team including doctors, physicists, pharmacists and nurses, who support and care for patients during diagnostic and therapeutic procedures.

**Could I cut it?**

A large proportion of my time is spent with patients, so anyone wanting to enter this profession must enjoy working with people of all ages from babies to the elderly. I’d say the most important qualities they should have are enthusiasm, a caring nature and good communication skills so they can work as an effective team member.

For further information follow the menu on the IPEM website to Careers & Training.

Written by Dr Sharon Ann Holgate and designed by Louise Southwell for the Institute of Physics and Engineering in Medicine, which is the largest professional organisation in the world catering exclusively for physicists, engineers and technologists who apply their knowledge and skills to medicine and biology.

Images provided by Lucy Richley, Andy Harris, Tim Adlam, Jo Young, Steve Keevil, Barbara Dawson and Siemens.