Case Study: Medical Physicist - Kevin

What do you do?

My job is head of the instrumentation division within medical physics, and that involves directing the services of the group. These include repairing and maintaining a wide variety of medical devices.

We also design and develop new medical devices. Some of these are electronic or mechanical in nature. We have design laboratories and workshops that allow us to do that work, and teams of qualified engineers and electronics engineers who do the design and build work.

Some of the medical devices that we help to maintain are quite critical in their nature - equipment such as ventilators or radiotherapy treatment machines, so it's important that the team is highly qualified and that the work that they do is carefully managed.

As another part of my role, I'm expected to do some research work, within my own fields of interest, which are medical ultrasound and medical electronics, so I manage to get some time to do some work in those fields.

What is your background?

My original background is in electronics engineering. I did a degree in electronic engineering at university and then a PhD in a related subject, and then went on to work in industry as an electronics engineer for a few years.

After seeing one or two articles in journals and magazines about medical technology, particularly imaging technology, I became very interested in the idea of applying my electronics skills to medicine and medical devices, imaging in particular.

Eventually, I found a post working in medical ultrasound as an electronics engineer, in Newcastle.

I spent many years working there, and ended up doing design work with electronics to help to improve ultrasound imaging equipment and develop systems for measuring the performance of ultrasound imaging equipment.

I also got involved in using medical ultrasound clinically on patients and carrying out some research work with medical ultrasound, involving patients.

What characteristics do you need to be successful in your job?

I think if you want to work in medical physics, you need to have a caring attitude and you must want to help other people, such as patients in the hospital. That's one of the great attractions of this kind of work.

When working in a hospital, you will quite frequently come into contact with other healthcare professionals, and probably patients as well. So, it's important that you have good communication skills, for example, to be able to communicate physics ideas or information that relates to the safety of an investigation or piece of equipment.

You also need good problem-solving and scientific skills. An important part of our role is to provide scientific support to the healthcare services and to solve scientific problems as they come along, so for instance, if we're dealing with radiotherapy equipment, we need to make sure that we understand the science and the technology of that equipment very thoroughly.

We need to make sure that we tackle the things that we do in a very scientific and robust way and we need to have skills that allow us to solve problems as they come along.

As new equipment and techniques develop and come into the healthcare sphere, we need to be able to keep up to date with these changes in practice and technology.

What other jobs could you do using the skills from this job?
With my background in electronics engineering, instead of coming into health care, I could well have gone on in industry, doing electronics design.

There are a wide range of industries, certainly in this country, that employ electronics engineers to do design, ranging from manufacturers of electronic goods or even domestic goods, to the defence industry.

If you come into medical physics through the physics degree route, then the alternatives for a physicist include working for manufacturers. Also, the power generating industry would employ radiation physicists.

There are other, probably narrower, opportunities, in things such as exploration for geophysicists, if you specialised in that particular area. Physicists who do well academically might well go into research in universities or into teaching.

What changes will there be in the future?

I see changes already in electronics technology. When I first started doing electronics, the components that we dealt with were very primitive. And, electronics design was very much 'hands-on'.

Now, a lot of design work is done through a keyboard, as we do with lots of other things, and there's far less hands-on manufacturing of electronics devices.

This has been one of the great technological changes that has been seen in the last few years, and I anticipate that will carry on changing in the same direction.

Design engineers will work on a much higher level; they will work with highly sophisticated computerised modules that they will then put together to form a system.

The other changes that we see are changes in healthcare practice and technology. It's very difficult to predict how healthcare practice might change over the next ten or twenty years.

For instance, if someone found a cure for cancer, then we wouldn't need to have radiotherapy departments anymore, and a lot of people who'd spent many years working in that role would have to find something else to do and would have to adapt.

Healthcare practice and therapy techniques are changing all the time, so clearly, we have to keep up to date with those changes and to solve new problems that arise from those new techniques as they come along.

What are the biggest challenges in your job?

For me personally, I think one of the biggest challenges is getting a healthy balance between the pressures of providing NHS service work, by which I mean going to meetings to help choose new types of equipment or organising a service to repair or maintain the medical equipment that we have around the hospital, doing that kind of work, and doing some scientific, innovative work.

As scientists, we always want to spend our time doing science and doing research because that's what we find most interesting but we're employed by the NHS to provide a service, to provide technical and scientific support to health care.

The service work can very often be very reactive, in that you can get lots of phone calls each day when things go wrong or when things need attending to quickly, and sometimes they're urgent, if patients are waiting in the waiting room and the machine needs to be fixed, so you have to go there immediately and solve that problem before you come back to do your scientific work or the things that you'd planned to do during the day.

Are there many opportunities to enter this career?

Normally, there are in the order of sixty to eighty vacancies for training posts in departments around the country each year, and the experience of most departments is that they sometimes have difficulty filling those posts.

So, if you have a good degree in physics or expect to get a good degree in physics, such as a 2:1 or a first, and you have good communication skills, then your chances of getting one of these posts will be quite good, especially if you've also demonstrated some commitment to or interest in medical physics by visiting, say, a medical physics department or taking a medical physics option in the final year of your degree.

What do you like about your job?
Well, there's two things that I like about the job, which I think if you asked most medical physicists they would tell you the same two things as well.

The first, really, is the potential reward we get from working in health care where the things that we do, hopefully, will help people who are sick to get better or to lead a better life in some way. So, we get some good rewards from that aspect of the job.

And the second aspect that gives us reward, if you like, is doing good science. Scientists like to solve problems, to develop new scientific techniques, solve scientific problems, and that gives us a reward just from finding solutions to those problems.

But, in medical physics, if you can put those two things together, if you can solve a scientific problem and the outcome of solving that problem is that it helps somebody to get better in their hospital bed, then you get a double reward and that makes the whole thing feel much more worthwhile.

What do you dislike about your job?

There's nothing in particular that I strongly dislike or hate about my job. But, sometimes my job can be frustrating. As I've talked about earlier, the job is a mix of doing science and providing scientific support to health care.

Scientific support work is usually reactive; quite often we have to dash off and help out somewhere and mend a piece of equipment, whereas the scientific work is something I want to do when I feel like doing it.

So, one of the frustrations that commonly occurs is that I get involved in some scientific work that I particularly enjoy and then the phone rings, so I have to stop everything and go off to do something else.

It's all part of the job and the things that we do are necessary and they help somebody at the end of the day, but at the time it can seem a little frustrating.

What are your ambitions?

My ambitions, as always, are to do more and better science, more and better scientific work.

I feel there are always lots of challenges in health care. We can all do things better, we can all apply new technologies but when I get to the end of my career in medical physics, I would like to be able to look back and feel that I'd achieved a number of things in my scientific career that have been worthwhile and that have helped people, and that have left their mark on medical physics.

What advice would you give to someone interested in your career?

If you want to get a job in medical physics in the NHS, the first thing that you need is a good degree in physics or another relevant scientific subject.

By a good degree, I mean normally a 2:1 or a first in physics. Before you go to an interview for a training post in medical physics, I very strongly advise you to find out something about medical physics and what medical physics departments do in hospitals.

To do that, you should try to arrange to visit a medical physics department to talk to people in their department.

If possible, get some work experience, even if it's unpaid, in the department, and, if you have any opportunities for taking medical physics options in your degree course, then take those.

So that when you get to your interview, you can demonstrate clearly to the interview panel that you know what medical physics is about, you know why you want to do medical physics and you've demonstrated a commitment to wanting to do it by spending some of your own time finding out about it and actually doing some work in medical physics.

A day in the life

8:00 am - 9:00 am

I use this quiet time for activities such as reading scientific journals and writing lectures (I sometimes lecture on medical physics in Portugal).
9:00 am - 10:30 am
Meeting, for example, to discuss the selection and buying of medical equipment. This involves judging bids and tenders from manufacturing companies.

10:30 am - 11:30 am
Management tasks, such as discussing personnel issues or recruitment needs.

11:30 am - 12:30 pm
Using a database to analyse work activity statistics, for example, repair work done by the maintenance teams. I need to identify issues such as backlogs, crisis points and lack of resources.

12:30 pm - 1:30 pm
Lunch.

1:30 pm - 2:30 pm
Spending time with a trainee medical physicist, either doing a tutorial or taking them through a measurement technique in the laboratory. Discussing their work, possibly suggesting improvements.

2:30 pm - 3:30 pm
Writing lectures.

3:30 pm - 5:30 pm
Reading scientific papers. Working on a research project, such as computer modelling work, or doing measurement testing in the laboratory, for example, on ultrasound equipment.