This booklet has been developed to offer practical support to help you to get the job you aspire to. In it you will find a range of resources, including:

• career stories and advice from physicists who have changed their career directions;
• a career-change framework to help you to create a personal action plan;
• links to resources relevant to physicists and career changers;
• a framework for you to develop your own tailored career plan.

We hope that you find this guide interesting and useful.

Written by Dr Sara Shinton
www.shintonconsulting.com

Sara Shinton works with a range of organisations in a variety of ways, but with a common theme of improving the career management and effectiveness of scientists and researchers.
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**Preface**

Read this section first.

Whatever stage you are at with your career, it is important to take the time to work out what you want your future to look like.

In this section we outline a simple career-change process that will help you to make better career decisions.

**The right help at the right time**

Once you have worked out what you want from a career, this section should stimulate you to come up with potential careers or employers to investigate further.

**Making it happen**

The final section of the guide contains practical advice and a career planner to complete. Our specially selected resources should help you to market your skills and experience more effectively.
Preface Prof. Brian Cox

I always wanted to be a physicist. I have no memory of the moment I realised it – perhaps it was watching Apollo 11 land on the Moon when I was 16 months old, which would qualify me as one of “Apollo’s children”. I found that term in an article about the greatest legacy of the Space Program – the generation of kids who watched in awe as the human race, for a few brief and precious moments, triumphantly over-reached, and chose to be scientists and engineers as a result.

Humans are at their best when exploring, and I see science as real exploration; striving to see a little bit further beyond the horizon. I’m unashamedly romantic about it. Science and engineering are the greatest, most inspirational and most useful things that humans do.

My career in science hasn’t been conventional, but then I know a lot of colleagues who’ve followed interesting and unusual routes through their lives in science. Perhaps there is a reason for this; science degrees teach you to be inquisitive, argumentative and give you great bullshit detectors. People so equipped tend to lead wonderful lives. This is why scientists are so highly sought after in so many different worlds. One of my favourite extracurricular activities was working as a consultant on Danny Boyle’s film, Sunshine. I remember one day when Danny assembled the cast and asked me to give a talk about the physics of the Sun. They told me afterwards that he’d given them explicit instructions to watch my reaction when someone said something silly: “Listen to how he says NO with such astonishing conviction (it sounds even better in an Oldham accent, but that’s not very Hollywood) and copy it in your performance.”

I’ve been very lucky in that I’ve managed to combine my passion for doing science with my passion for getting more people to do it. The prerequisite was getting a good degree, and in my case this led to a PhD in particle physics and a series of research fellowships, first with PPARC and latterly with the Royal Society. I’ve also managed to become a TV presenter and public speaker of sorts, but only because I am a scientist first and foremost. There is a certain confidence – a clean, crisp, logical way of approaching problems – that comes uniquely, in my view, from a scientific education. It’s this that Danny Boyle wanted his actors to capture, and it’s this that makes scientists so essential and valuable in our culture. Notice that you have been trained to think in a special way, take that seed and let it flourish, and wonderful doors will open for you.

Brian Cox is a Royal Society University research fellow based in the Particle Physics group at the University of Manchester (www.man.ac.uk), where he holds a chair in particle physics. As well as his “proper job” he has also been a chart-topping musician and now works as a scientific consultant, writes on scientific issues in the popular press and is a presenter on TV and radio, including Horizon.

There is a certain confidence – a clean, crisp, logical way of approaching problems – that comes uniquely, in my view, from a scientific education.
This guide has been written to help you to make an effective and successful transition into a job or working conditions that better suit your strengths and situation. In the three years that have passed since we produced the first edition of this guide, the rate of change and the impact of external influences has grown. With increasing political pressures on research agendas, emerging economies having a greater impact on the UK’s base of manufacturing and research, and government policies trying to boost the educational and skills level of the population, the labour market and career paths are more susceptible to change than ever.

There are many publications available that tackle the subject of career change, but most of them focus on general principles. This one has been written specifically for physicists and includes useful and inspiring case-studies of people who have successfully handled the transition into all of the careers described, with physics training or experience. We have included a few of the interviewees from our first edition because they make for fascinating case-studies and re-interviewed one individual to see how her career change has worked out, but mostly we’ve found a new group of former and current physicists to share their perspectives on the new and exciting directions that their careers have taken.

This guide does not go into detail about the theory of career change because this is described in many other places. Instead it aims to demonstrate how career change can happen, and to boost your confidence in changing your career as successfully as others who are profiled here have. Their case-studies describe the steps that they went through to make their career transitions and their reasons for wanting, or having, to change. Although there are many differences in their motivations and their approaches, there are common themes. To make these more accessible, each section finishes with a set of practical steps derived from the profiles and other sources to help you to start moving your career forwards.

Different types of career are described in each case-study but all offer useful advice, so we recommend that you read all of the profiles, even the ones for jobs that don’t appeal to you. To help you to navigate, the contents page shows you what the sections cover and how they link. If you are only interested in specific elements of the guide, we have written summaries at the end of each section to help you to pick out the key points.

At the back of the guide there is a checklist for you to use to help formalise your career planning.

In researching and writing this guide we have found more evidence of the key messages from the first edition: that training and experience in physics provides skills and knowledge that appeal to many different employers and that physicists can be agile and creative as their careers progress. We hope this guide inspires you to take your career in a new direction.

The references section at the back points to more in-depth publications on career choice. What we present here covers the basics.
Although this guide has been carefully researched and written to give your career plans a boost, it is only one of the ways in which the Institute of Physics can help you during your career. Whatever stage you are in your career, the IOP can help you.

The right help at the right time
If you have studied for a degree or postgraduate qualification, your higher-education establishment will provide you with a well resourced careers service offering advice, information and opportunities to meet potential employers. For the first years following graduation (the exact length of time varies from institution to institution) you can still access this support or gain limited help from your local institution if you have moved away.

For many people the points in their career where they need advice and support fall outside this early provision from the universities. Luckily, members of the Institute of Physics can access their own careers service and draw on a range of support and opportunities at any stage of their career.

**Launching your career**

At the start of your career, involvement with the Institute can help you to connect with other people interested in specific areas of physics. In these networks you are likely to be kept up to date with issues that may affect your career and be made aware of a wider range of employers.

**In the early stages of your career you can use the IOP to:**
- connect you with a mentor;
- meet other physicists through the subject groups or local branches.

**Building foundations**

As your career progresses, you are likely to need a wider range of skills as your responsibilities grow. You will also need to demonstrate your professional progression and may be facing competition for promotion.

**At this stage of your career, the IOP can help your career development:**
- by offering online skills training in key areas;
- by awarding chartered status as evidence of high professional standards;
- with opportunities to serve on subject group committees.

**Balancing work with life**

For many physicists, the mid-career stage must accommodate new challenges – caring for children or other family members. Even if you need to take a break from physics at this stage, the Institute is still able to help with this transition point.

**If you are trying to balance work and family commitments:**
- look at the publications produced by the Institute’s diversity group, which include a guide to career breaks;
- join the Women in Physics group and get involved in their range of professional and personal development activities.

In addition to the support offered by the Institute, the Daphne Jackson Trust is the UK’s foremost returners’ scheme and has a 96% success rate for returning scientists (male and female) to work. The trust offers two year fellowships with host organizations on a part-time basis, with 100 hours of retraining. Although it can’t guarantee you a job, it does guarantee to take away the disadvantage of your career break and put you back on a level playing field in the job market.

For more information, see [www.daphnejackson.org](http://www.daphnejackson.org).

**Progression and impact**

As your career progresses, there are many opportunities provided by the Institute to ensure that you are visible and having an impact in your chosen field. This may also be the stage of your career where you can help with the next generation of physicists by providing advice and support.

**Look for opportunities to:**
- publish your work in the institute journals or feature in *Physics World*;
- speak at the Institute’s conferences;
- act as a mentor to other members – you will be fully supported and guided by the Institute.

Look beyond work and begin to think about life after work. There are many ways in which you can work with the Institute to contribute to the future of physics.

**Consider getting involved in:**
- science outreach activities, such as Lab in a Lorry;
- organizing events or outings for local branches;
- acting as a mentor to younger members.

Whatever stage you are at in your career, if you are facing change or uncertainty, or simply want to discuss your career with an experienced professional, you can use the Institute’s careers service, which offers the following services:
- individual face-to-face advice;
- CV feedback;
- mock interviews;
- redundancy advice;
- effective marketing of your skills;
- identification of new career directions.

Please contact us with your query and we’ll do our best to help you to develop a successful, satisfying and inspiring career.

Vishanti Fox, Careers Manager, Institute of Physics. tel 0207 470 4906
e-mail members.careers@iop.org
How to change your career
Since you are reading this, you may already be looking forward to changing your career. Before you start to investigate your options, you need to spend a little time reflecting on what has influenced your desire to change your career.

A variety of factors prompt career change. Some are personal and relate to changes in your motivation or new responsibilities in your home life; others are outside your control, such as redundancy or the end of a contract. You may be frustrated by a lack of career progression, uninspiring work or difficult colleagues. This section of New Directions has been put together to prepare you for the changes ahead, regardless of what has prompted you to start looking for alternatives.

Career change is more than just finding an appealing vacancy. The crunch comes when you have to convince an employer that you are the best possible person for them, especially when competing with more qualified or experienced candidates. You must remain positive at all times, and be able to sell the benefits of your unusual background in terms of the additional, relevant skills it has given you.

If your career change was enforced, focus on the opportunities that this has given you and ensure the employer doesn’t sense any frustration or regret.

If you are instigating a change, before you read any further it is important to take the time to analyse what is behind this. Being unhappy at work dents your confidence and self-esteem, so it is only natural to be flattered and tempted if a position comes along that offers an escape route. Unfortunately, if you don’t get to grips with the factors behind your current discontent, there is a very real danger of finding yourself in a new company or career facing similar problems in the future. Just a few hours investment now can avoid a bad decision, or convince you that the offer is a sound one.
Assess your situation

A simple way to assess your situation is to look at the pros and cons of your current job. There is a pros and cons table in the green section of this pack. Try to spend a few days on this (not continuously), returning to it as you go through a typical working week.

Think about more than just the day-to-day activities and frustrations. Are you happy and motivated to work in your current employment sector? Are your employer’s values consistent with yours? Is the reward system (salary, benefits, opportunities or responsibility) motivating you? If not, what would motivate you? Also look beyond work, at your home life – do you have to take into account a partner’s career, a large mortgage or children settled in schools?

Be honest with yourself at this stage – when you are faced with decisions later on, this list will help you to judge possible jobs realistically. Keep any alternative careers or jobs out of your mind at this stage and try to build up a comprehensive set of criteria for the ideal job. The aim of this activity is not to set unrealistic expectations of finding a perfect match. Instead the intention is to recognise all of the factors that will influence your career choice so that any compromises you may have to make are identified clearly.

Work out what you have to offer the world and what you want in return

Skills analysis is essential to career management and one of the cornerstones of making a career transition. There are many tools available to help you, and a growing number that are specifically aimed at scientists, particularly those in academia. We list these at the back of this guide.

As well as analysing your skills and thinking about any preferences for the kinds of activities or tasks your job involves, you should think about your values and motivations. These are often difficult to define but may be the root of your need to change career. Think about how you would like to be recognised, the kind of work you want to do and the kinds of employer that appeal to you. Again, resources are suggested to help you to work these out before starting to compare potential jobs and employers.

Don’t restrict your skills analysis to your current or former jobs – think about the talents you have, the tasks you relish and ask friends and colleagues for their views on your strengths. Are you someone who is always asked to help explain how to use particular systems or equipment at work? Do people tend to come to you if they are struggling to formulate new ideas or are stuck with a problem? If you can play to your natural strengths in the next stage of your career, you are more likely to be successful – particularly if you can find a way to get paid for things you actually enjoy doing.

Identify the possibilities

Once you have an idea of the characteristics of a preferable job or employer, you can begin to look for a match. There are thousands of different careers available, so if you are entirely open to fresh ideas you’ll need to narrow down your options before you research any in detail. One method is to use a computer guidance programme, such as Prospects Planner, which is available in university career services or online (although this is a simplified version). Most local authority careers services have a similar system called CareersMatch covering a wider range of occupations (because it is not aimed at graduates).

Remember the limitations of any computer program and be prepared to reject the majority of careers suggested. The main advantage of them is to suggest jobs that you would never have considered or to clarify a preference for a particular field or employment sector. They are also supported by large databases of careers information, which will allow you to research job and employment sectors quickly.

Another useful method for generating career ideas is to do a job clip. Take the vacancy sections from a range of publications (Physics World, New Scientist, national and local newspapers and websites) and save examples of any jobs that appeal to you (even if you are not qualified or experienced enough to apply for them). Along with the advert or job description, keep a few notes on why it caught your attention and which elements you would like to make part of your future career. This may help you to develop the answers in your skills analysis and prioritise your career requirements.
Once you have narrowed down your list of options, you should start to research these in detail. The web has caused an explosion of careers information, so you should focus your research on the criteria that you have developed. The resources page suggests the best websites for starting career research.

Armed with an understanding of the nature and requirements of a job, you are ready to discover the reality that lies behind the company literature. A reliable method of matching the job that you are considering to your requirements is to talk to someone who is already doing it. Although it may seem intrusive to question someone about their job (and whether they actually enjoy it), you’ll find that most people are happy to talk about their work, provided that they understand why you are asking. At this stage it is best to ask for information rather than a job, so make this clear to them. You’ll find a guide to interviewing people on page 48.

Try to ensure that any research into a prospective job includes these personal perspectives and opinions, particularly on the issues that are central to your career choice. Some of these (attitudes to flexible working, management styles or pay) are difficult to ascertain during a recruitment process.

If all of the boxes are ticked then you need to commit to the change. Start to tell people about your new career interest (being discreet if you are still working in another field), particularly those who have contacts or may know of vacancies. Call human resources departments and ask how vacancies are handled. Many companies use recruitment agencies, so you need to be sure that you are registered with these. Sign-up for e-mail alerts from relevant websites and find out which publications carry job adverts in this field. As you read the profiles of other researchers who have made career moves, you’ll see that using a range of job-searching strategies is the most effective approach.

Armed with an understanding of the nature and requirements of a job, you are ready to discover the reality that lies behind the company literature.
Real stories from career changers
Using physics at the heart of your work

The application of physics is widespread, so there are opportunities in a huge range of sectors, organisations and companies. The latest edition of the Institute of Physics salary survey tells us that members work in a range of sectors – academic, educational, industrial, commercial, governmental and health. The key industry sectors are telecoms, electronics and IT, aerospace and instrumentation, along with a range of manufacturing industries.

How do I decide which sector will suit me best?

Focus of work

If you are keen to see your technical knowledge applied to projects with real-world applications, then industry is likely to suit you because all research and development work has to have commercial value (or at least strong potential). This may be focused on evolving new products and techniques, or improving existing ones. Whatever the exact nature of the work, the emphasis is on producing something that meets customers’ needs. The downside is that work that does not show commercial potential will be discarded, which could be frustrating if you believe in its potential.

The scientific civil service and health service are equally interested in direct application, but the emphasis is different – patient care, national security or defence, among other areas. Many people are drawn to these sectors because of personal values. They are keen to work in an area that makes a contribution to society.

Most people in academia will refer to intellectual freedom if they are probed on their motivations for working in this sector. The opportunity to research a topic of personal interest is the unique factor holding them in a sector that offers lower pay and fixed-term contracts (until academic tenure is achieved). Most researchers and lecturers (remembering that lecturers are not purely teachers and remain research active) also cite the freedom to manage their own time on a day-to-day basis, without having to conform to a 9 to 5 timetable. Knowledge and individual achievement are recognised and, in the early stages of their careers, staff are encouraged to build personal research strategies and groups.

Organisation culture

The size of an organisation has a major influence on the working culture, so it is important to investigate the impact of this on the day-to-day working lives of its employees. Publicly funded bodies, such as the NHS and civil service (among the largest employers in Europe), are trying to become less bureaucratic and more accountable, so many changes to organisational structure and individual responsibilities are happening. Some staff will find this stressful; others will welcome the opportunities that change brings.

Large commercial companies will have identifiable corporate cultures that you need to be aware of before you start work with them. These will affect the criteria for progression, management structures and flexibility of opportunity. Some companies will offer people chances to work in any area of the business that they feel they can contribute to; others will tend to keep people on rigid career paths, which may affect progression later in your career, but could be appealing if you want to remain in a technical role and not be given managerial responsibilities.

In smaller companies you may only have the opportunity to work on a small range of projects, but you may be more likely to be required to contribute to other business areas, such as customer support or management. Bear these “hidden factors” in mind when looking at companies – they can be a root cause of dissatisfaction later.
The nature of academic research is traditionally very different from industrial, due to the method by which it is funded and the personalities of the people who are drawn to academic careers. Physics is studied and applied across the full breadth of the subject, rather than just in topics with potential application. However, as academia is increasingly scrutinised for evidence of value provided to the UK economy, there is more emphasis on applied and interdisciplinary research.

**Gaining insights**

**Industry**

Company websites are the best place to start researching, and most carry profiles of staff and recruitment information. They aren’t a substitute for real people, so try to identify someone who can tell you about their job, what it is like to work for a company and how recruitment happens. There’s more advice on this on page 50 “Asking people about their jobs”. If you are interested in a company, look at the local press for news about developments or for the names of key people. Having a named contact might get you through the receptionist. If there are local business networks available, consider attending meetings to build your knowledge of employers. If you are looking farther a field, there are a number of IOP networks that will help you to meet physicists working in a range of industries. Salary information on industrial jobs can be more challenging to find and you may get used to the frustration of seeing “competitive salary” on adverts. Instead, look for general websites comparing sectors and use the IOP salary survey as a starting point. To build your commercial awareness, read broadsheet papers and magazines such as *Physics World*.

Some companies recruit using agencies, so find out which to target and look at the frequency with which they advertise in key publications. Also, contact the company’s human resources department for advice, but first check their websites because most will post current vacancies online.

**Public sector**

The media gives many insights into the public sector – not all of them positive. As with all careers, your research is most effective if you can talk to someone working in the area you are interested in. Given the size of this sector (the NHS is the biggest employer in Europe) it is likely that you will know someone working in it.

Government websites will give information about the important issues and strategic directions of public sector organisations. Additionally, the *Prospects* website carries a number of interesting articles on the health and government sectors (see www.prospects.ac.uk and search for “public sector”).

**Academic**

If you are completely new to academia, again the *Prospects* website gives a good overview of higher education (see www.prospects.ac.uk and look at the “Explore job sectors” section). For specific universities, look at their websites and annual reports. All institutions produce postgraduate prospectuses describing the qualifications, subjects available and contact details of those who will be willing to answer your questions and arrange a departmental tour.

As with the other career areas, the best advice comes from people involved in academia, so contact the Institute to identify opportunities to network with academics.
An excellent site for researching academic culture and careers is Science Careers at http://nextwave.sciencemag.org/uk. You should also read Times Higher Education for an insight into the politics and culture of the higher-education sector. Many vacancies are posted online at www.jobs.ac.uk, www.findaphd.com and www.findapostdoc.com, but for short-term opportunities, direct contact is still effective.

Getting there

Whatever sector you feel will suit you best, even if you are planning to base your career on your scientific skills and expertise, you mustn’t assume that your CV can be “one size fits all”.

For industrial positions:

- understand what the employer is looking for and redesign your CV, radically if necessary, to demonstrate that you meet these requirements;
- talk to people who have experience of the field of interest and ask their advice about how to present your background;
- tell people that you are looking for a change so that they can let you know about any opportunities they hear of;
- be prepared to take a number of steps to get into your preferred job;
- target a range of potential employers or internal departments and don’t be put off if some aren’t interested.

To start your transition in your current job:

- gain additional qualifications;
- change the direction of your research to give you relevant technical skills;
- take on new activities that expose you to external bodies or customers.

For public sector positions:

- for technical or research positions, the advice is similar to that for industry: demonstrate you have the skills required;
- do work experience (i.e. work shadowing), which can help to demonstrate that you have a commitment to health-related science for NHS positions (try to arrange this directly with your local hospital’s clinical science departments).

For academic positions, entry is possible at a range of levels, with different requirements.

At PhD level, most supervisors are looking for:

- an understanding of the demands of a PhD, particularly from potential students who have spent time away from the academic environment;
- a good general understanding of the physics underlying the project;
- enthusiasm;
- eligibility for grants (many funding bodies insist on a minimum classification of 2:1 at undergraduate level or Masters’, although others are more flexible).

For researchers:

- at postdoctoral level, a doctoral level qualification is needed;
- a PhD is essential to progress in academia so anyone with ambitions for a research career is advised to study for a PhD part time;
- experience of research and the ability to work independently (these are integral to the role).

Lecturing staff:

- are recruited on research outputs (due to the Research Assessment Exercise and the criteria of funding bodies);
- must have published a number of high-impact research publications and be able to give evidence of their ability to secure funding;
- are not recruited for their teaching skills, although the job title implies a focus on teaching;
- may bring specific research skills or knowledge to complement expertise in a department, but publications and funding are usually the main criteria for recruitment.
### Real stories: Using physics at the heart of your work

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<tr>
<th>Name</th>
<th>Andrew Riley-Watson</th>
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<tr>
<td>Job title and employer</td>
<td>PhD student, University of Sussex</td>
</tr>
<tr>
<td>Previous occupation</td>
<td>office manager, BT</td>
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#### Initial career choice
I drifted into working for BT after dropping out of a physics degree at university. After working as a waiter, I joined BT and worked in various customer service, sales and latterly management roles in both Aberdeen and London for the next 10 years.

#### What were the circumstances under which you decided to change career?
I was looking for a new direction, having decided that I didn’t want to spend my career in people management. In 2004 I found out about Birkbeck College’s part-time physics degree and went along to UCL (which do the teaching) for an interview. As a result I took Birkbeck’s year-long foundation course in physics sciences. After graduating with distinction I started Birkbeck/UCL’s four-year part-time physics BSc in 2004. Shortly before my first-year exams my son was born. In the course of the degree I gradually decided that I wanted to continue with physics afterwards. In 2007, just before the start of my final year, I took redundancy from BT and my daughter was born. Around March I was accepted for a PhD at the University of Sussex, dependent on my BSc results.

#### How did you decide on a new career direction?
I realised that physics was what I truly wanted to do, although it would be a very long journey to get there (it has taken five years' so far, and I now have three years PhD study ahead of me.) One tool I used to help me to decide was a careers report from an online agency. This recommended a technical, research-type career and this, together with my past interest in physics, helped me to decide on the physics degree.

#### What were the main barriers or difficulties in changing career?
Funding my degree, fitting in study around a full-time job, and two small children. I was very fortunate to be offered redundancy from BT at the start of my final year, and this made the decision to switch to physics full-time a lot easier.

#### What advice would you give to someone interested in moving into this field?
It takes a long time to get there, nobody will help you change direction and it’s hard work, but that’s what makes it so worthwhile in the end.

As we were going to press, we heard that Andrew’s hard work has paid off as he has achieved a first-class degree and will be starting a PhD in a few months.

---

**One tool I used to help me decide to was a careers report from an online agency.**
Initial career choice
My first job post-PhD gave me the opportunity to stay in Scotland, but allowed me to work on challenging applied research problems that utilised my skills and allowed me to develop them in the ways I wanted. I remained there for 13 years, eventually being promoted to principal consultant engineer.

What were the circumstances under which you decided to change career?
Merger and consolidation placed constraints on further advancement that conflicted with my other interests (pressure to relocate south), and additionally restructuring imposed limitations on the areas of interest that I could be involved in without relocation. In parallel I was experiencing increasing enjoyment in supporting and helping others to learn and develop.

How did you decide on a new career direction?
Academia seemed to offer a way to give my interest in developing others a much stronger emphasis while still allowing me to develop my research interests. I started occasionally looking at job adverts and by chance someone who knew me pointed out an advert from my current employer.

What were the main barriers or difficulties in changing career?
Once I had secured the position, there were some misconceptions about the balance of my priorities. I was expecting more time to be available for research. I found myself on a steep learning curve because I needed to develop teaching materials from scratch and assimilate new areas and working practices. Another difficulty was the lack of value that the university placed on my established professional networks, so I needed to broaden these to build my academic connections.

How did your education or previous career in physics prepare you for this job?
I would say that my undergraduate physics education was valuable in getting me my first job in an engineering consultancy because it gave me a very solid understanding of the physical world and how it can be modelled and analysed. This allowed me to readily understand and inter-operate with engineering, statistics and applied mathematics disciplines. My PhD opened the door to my first job because it enabled me to develop an interest in using computers and software as modelling and problem-solving tools, and this became core to my job in the engineering consultancy. My consultancy work developed my technical interests and skills in computer-based systems development in specific ways and also allowed me to develop management, problem solving, business-development and communication skills. These, I think, were all attractive to my academic employer when looking for a lecturer in computing.

What advice would you give to someone interested in moving into this field?
A strong, almost vocational commitment to and interest in education is essential if moving into a post with a significant teaching element. Be prepared to encounter significant bureaucracy and a less mature performance-management and rewards systems than are typically found in industry.
Initial career choice
I enjoyed solid-state physics at university and it seemed to be a natural progression to move into the applications of solid-state physics by working in the telecommunications industry.

What were the circumstances under which you decided to change career?
After being made redundant twice by the age of 25, I decided that I wanted more job security in a sector where I could establish myself and progress.

How did you decide on a new career direction?
I enjoy physics and technical problems, but equally enjoy contact with people on a day-to-day basis, so I thought that a clinical role in a hospital ward environment would suit me.

What were the main barriers or difficulties in changing career?
My role is based in the intensive care unit, so there are considerations such as “Do I want to work shifts or even on call?” because careers such as these are rarely your typical 9 to 5. Sometimes working weekends is necessary, which can be a difficult thing to get used to. Moving from a hi-tech private sector job to a career in the NHS meant a large salary cut, especially as it is becoming increasingly difficult to make a sideways move. A lot of roles in clinical technology or clinical physiology now require a professional qualification and can only be achieved through employment in a hospital. Many of these courses can take up to four years (day release) on a trainee’s salary – difficult when there are other commitments, such as a mortgage or even just changing your lifestyle.

How did your education or previous career in physics prepare you for this job?
The job description specified that a relevant HND in medical physics would be required (or relevant nurse training/theatre training, because people in this role come from a range of backgrounds), so I enquired whether a degree in physics would be acceptable. This got me a foot in the door. Since starting the job there is no one particular area of physics that has particularly helped, but the subject discipline is such that I am familiar with units of measurement. Picking up the basics has been relatively easy and I am familiar with the SI units of measurement commonly used in the intensive care unit.

What advice would you give to someone interested in moving into this field?
It can be difficult to move across from the private sector, but sometimes it is useful to get some prior experience of working in a hospital environment, as it certainly isn’t to everybody’s taste. There are many different NHS careers, some of which I hadn’t heard of until I started working in a hospital, so it is certainly worth researching the role and finding out what variations there are to the job.

As with any career move, it is essential to present your background as relevant, even if you’ve worked in a very different kind of role. The NHS trust that I am part of has a very well structured application form that enabled me to present my past experiences in a way that was relevant to the job application. I also presented my CV at an informal visit to the department prior to my interview, so I could explain what I had done and draw out the relevance of my experience.
Real stories: Using physics at the heart of your work

Name
Dr Jim Paterson

Job title and employer
Lecturer in the division of computing and creative technologies, Glasgow Caledonian University

Previous occupation
Lecturer in web design, Bell College, previously postdoctoral researcher

Initial career choice
Following my PhD I was attracted to postdoctoral research because as I saw it as a natural progression and one that would give me a chance to travel and work abroad. I completed a couple of contracts before moving to the IBM laboratories in California, then the Cavendish Laboratory in Cambridge University and Liverpool University. At this stage I found myself in the postdoc trap because I wasn’t able to secure a permanent position but had become too expensive for further contracts. I was keen to return to Scotland so took on a teaching qualification, which I felt would lead me into a more secure career, although I didn’t particularly enjoy the course. Unfortunately I finished the qualification at a time when all teaching jobs were very competitive and I found myself as a supply teacher. Around this time I was suggested for another postdoc by a friend and started a four-year contract – ironically this turned out to be a more secure option.

What were the main barriers or difficulties in changing career?
Moving to Bell wasn’t straightforward and after my initial interview I wasn’t offered the job. Around a month later I had a phone call and they offered me a different lectureship. Someone who had recently left the college had left a skills gap and they remembered my expertise in web programming, so made me an offer. I stayed at Bell for five years and then applied for a job at Glasgow Caledonian University and was successful – but in a completely different area from my research background. I now work in the division of computing and creative technologies (my PhD was in solid-state electron microscopy).

How did your education or previous career in physics prepare you for this job?
My research background was a definite advantage in going for the job at Glasgow Caledonian, even though my experience was in a different field (and the physics department had closed). It gave me an understanding of how to do academic research, how to publish and how to apply for funding, which I’ve been able to transfer into my new discipline. A key factor in securing the job at Bell was my experience in web design – something I had consciously decided to develop throughout my career, in parallel with my research, because I was sure it would give me skills that were in short supply. In fact I knew other people who had applied for jobs at Bell after me who were not successful because they lacked this expertise.
What advice would you give to someone interested in moving into this field?

Moving into a permanent academic position is difficult, but look at the range of institutions available. Glasgow Caledonian appoints people from a range of backgrounds so it is possible to deviate from the classic academic path and still be successful. The key is to develop a specialism that complements the department you are interested in. Look at the way university degrees are developing and talk to people about the skills that are in short supply. At the moment we need to strengthen our expertise in networking and psychology (the latter for our game-programming research), so a candidate with experience or qualifications in these areas would be at an advantage. Another practical step to take is to gain additional qualifications – such as CISCO or Microsoft certification. Find out what your future department needs and use your initiative to develop these skills.

Why did you choose your first career?

I started my PhD with the intention of moving into technical marketing, working for somewhere like a spin-out company. As an undergraduate I’d been the first person at Surrey to take a non-research sandwich year in industry (at IBM) and I enjoyed the combination of technical expertise and communication I used there. I wanted to work in a position that was technical enough to need a PhD and I had been interested in the applications of magnetic resonance imaging, so I opted to research this topic both out of interest and because of the employment possibilities available.

What were the circumstances under which you decided to change career?

Before and during my PhD I had been very active in promoting the physics department, doing UCAS talks, helping on open days, etc, and prof. Daphne Jackson, then head of the department, asked me to continue doing her school talks when she became ill in 1990. I enjoyed these and enthusing the kids about science careers, so I decided that I would be ideally suited to a career in science communication.

How did you decide on a new career direction?

Once I had started to work in schools with the children I realised how important it was to give them accurate and inspiring information about science and the options that a scientific degree gives you. I found that the enthusiasm that you get back from children as you demonstrate science is incredibly motivating and I was far more drawn to a career “selling science” than selling technical equipment.
Real stories:
Using physics at the heart of your work

What were the main barriers or difficulties in changing career?

I struggled to find work initially and joined my local job club. I was then approached by the Education Department at the Institute of Physics to be the subject of a career profile – until I pointed out to them that I didn’t have a career. I explained what I was interested in and my experience, and they asked if they could call me back...which they did with details of a job coming up in the Public Affairs Department at the Institute, which I applied for. Unfortunately I didn’t get the job because of my lack of PR experience, but very shortly afterwards I was approached again. The person who took the job had left and they needed some short-term help because the Annual Congress was imminent. This went well and I was quickly offered a full time position.

Later in my career I hit another barrier. After I had my daughter, Holly, I was keen to continue to work but on a part-time basis. At the time I was told it wasn’t possible – things have thankfully moved on since. Although I was devastated at the time, I decided to leave rather than work full time. I called into the University of Surrey with my CV and asked the marketing department if it could use someone on a part-time basis. At the time a new director of marketing had just started and he offered me a freelance contract. Although I’d never considered freelance work, once I’d called a few former colleagues and friends for advice on what fees to suggest, I put together a proposal for him, which was accepted immediately.

What do you think convinced your employer to appoint you?

Initially they weren’t convinced – despite the experience I had in schools I was competing with people who had experience as press and PR officers. I was appointed once I had the opportunity to show that I could do the job as well as anyone else. I got on well with the people I worked with and fitted in well with the department.

How did your education or previous career in physics prepare you for this job?

My PhD has been essential for the credibility that it gives me when talking to scientists, as well as the technical ability to report accurately on complex topics. At Surrey I tended to work in science-based areas and really enjoyed the process of being able to talk to scientists in their own “language,” and then translating this into some thing that was meaningful to journalists and their readers but still had scientific integrity and accuracy.

Although the Daphne Jackson Trust now employs me, I’ve continued to work on a freelance basis as a science writer and run workshops for scientists on media training and communication. The scientific grounding that my degree gave me enables me to understand, learn about and convey engaging information on a range of topics in the physical sciences.

In a broader sense, the transferable skills that a PhD develops are constantly useful. The project management, time management, discipline to work and ability to plan and implement have all made me really effective at all stages of my career.

What advice would you give to someone interested in moving into this field?

It’s tough, and you are likely to face the Catch-22 situation of not having experience and not being able to get any work (or experience) because you don’t have any experience. Although paid work is difficult to get straight away, the good news is that there are many opportunities for voluntary work, which will give you that priceless experience and (as important) put you into the science communication network. The BA Festival and Cheltenham Science Festival both depend on volunteers and any other event on that scale is likely to be the same. If you are working as a researcher in a university, you could get involved in the institution’s science outreach work, Lab in a Lorry (run by the IOP) or Researchers in Residence, a national programme.

For more information about science communication activities organised by the Institute, see www.iop.org/activity/outreach/index.html.

For Researchers in Residence, see www.researchersinresidence.ac.uk/rir/.

The transferable skills that a PhD develops are constantly useful.
**Initial career choice**
I’d worked for my first employer during university vacation. I wasn’t sure what to do when I graduated, so I took up their offer of a permanent job. I wouldn’t say I actively chose that career, although it did apply physics practically – something that I did want to do.

**What were the circumstances under which you decided to change career?**
I changed jobs twice in the paper-manufacturing sector. I was headhunted the first time, and the second move came about because I kept in contact with a former colleague who had moved to a different company. I told him that I was getting itchy feet and he set up an interview with his employer, which led to an offer.

The company I worked for after graduating had funded me to take a management diploma (which wasn’t very interesting), so I approached my new employer to ask if they would do the same. They agreed and I decided to study pure mathematics and theoretical physics (which I’d enjoyed as a student) through the open university to keep my brain working.

This helped to maintain my interest for a while, but the job turned out to be focused on customer support, which wasn’t a direction I wanted to take, so a desire to do more hands-on science (and to apply the physics and maths I was learning through my degree) was the main reason for looking to move.

**How did you decide on a new career direction?**
I wanted to work in a genuine research environment, so started looking elsewhere, but I wasn’t interested in academia – I hadn’t really enjoyed university that much. The Scientific Civil Service seemed to offer a more traditional research environment, so I applied to GCHQ (but didn’t get any further than a web application, probably because of my 2:2 degree). Then I saw that DERA was having a careers event at a local hotel, so I went along with my CV (the organisation changed from DERA to QinetiQ during my application) and distributed it to a number of the groups who were present. This led to interviews, a selection board and a job offer.

**What were the main barriers or difficulties in changing career?**
My Open University degree gave me specific knowledge and skills to help my transition, so the greatest barrier was probably my own lack of confidence about changing because I had spent so long working in a specific manufacturing sector – it was all I knew. The fear of leaving it too late was greater, though.

The transition that QinetiQ was going through (from a public organisation to a private-sector company) worked in my favour because it was aware that it needed to develop its external focus and become more customer focused. Although I hadn’t enjoyed this aspect of my previous job, it definitely boosted the appeal of my CV. Having said that, QinetiQ did take a chance on me – I hadn’t finished my mathematics degree at that point and it funded my final two years.
Real stories:
Using physics at the heart of your work

Name
Jaideep Barot

Job title and employer
head of physics, Westminster School

Previous occupation
Goldman Sachs International, “global controller” (basically an internal auditor)

How did you decide on a new career direction?
I already knew it was what I wanted to do.

What were the main barriers or difficulties in changing career?
The pay cut!

What do you think convinced your employer to appoint you (particularly if you were competing with more experienced applicants)?
The enthusiasm I had for my subject and for the prospect of teaching academically high-achieving pupils. My willingness to join in with the wider life of the school also helped.

How did you decide on a new career direction?
I already knew it was what I wanted to do.

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The pay cut!

What do you think convinced your employer to appoint you (particularly if you were competing with more experienced applicants)?
The enthusiasm I had for my subject and for the prospect of teaching academically high-achieving pupils. My willingness to join in with the wider life of the school also helped.

Why did you choose your first career?
I was looking for a well paid job on moving to London.

What were the circumstances under which you decided to change career?
I always knew that I was going to become a teacher (the investment bank was a stop-gap). The bank was fun in its own way but offered no intellectual challenge whatever. Other roles that I could eventually have moved into may have done, but it depends on how you feel using all of that wonderful knowledge and skill just to make yourself and those above you richer. I’m no new-age hippie, but it just didn’t feel like the thing for me.

How did your education or previous career in physics prepare you for this job?
Not at all for teaching, but to work at a school you have to be into your subject, and no intellectual mug.

What advice would you give to someone interested in moving into this field?
Talk to people, find out more about it, especially the type of school you would like to work in. You may want to do some training (e.g. PGCSE) but not all schools require it (independent schools do not require it, but often prefer it). You can do some training in post.
If you are keen to use physics directly in the next stage of your career, here are some key pieces of advice extracted from our case-studies and careers professionals.

**Qualifications and knowledge**

- Bring your qualifications up to date. If you are working full-time, a range of part-time options are available.
- Identify specific skills that are in short supply and develop these through training or expanding your current job.
- For teacher training there are bursaries available to support you during the postgraduate qualification you will need to teach in the state sector. See www.gttr.ac.uk.
- If you are hoping to return to a career in academic physics after a career break, the Daphne Jackson Trust may be able to offer financial support to establish a new research project or for retraining. See www.daphnejackson.org.

**Get clued up**

- Familiarize yourself with the current issues in any company or organization that interests you. Start with the website, but read more widely in publications like *Times Higher Education* (from academia) and *Physics World*.
- Talk to insiders and find out where any skills shortages are and which personal qualities are important for the job that you are interested in.
- Try to set up a work shadowing visit to give you a clearer idea of the demands of the new job.

**Practical steps**

- Make a plan and work out which steps you will need to take to move into a new position.
- Share your plan with other people, get feedback and take advice.
- Ask careers professionals for support (the Institute offers a comprehensive careers support service, including one-to-one advice) or invest in a good career-planning book. Ask for recommendations from friends and colleagues.
To those outside the subject, physics is perceived as being difficult, which has its advantages (employers without physics qualifications will assume that you are academically bright) and disadvantages (they may have preconceived ideas about your communication skills, and your ability to think and apply yourself in “the real world”).

Having a scientific background also opens new doors. The UK economy is increasingly focused on “knowledge”, which is seen as a future engine of economic growth. The attitude of the current government towards the transfer of this knowledge from universities into places where it can have an impact on society has also created a range of opportunities for those with scientific and academic insights.

If you are planning a career that will take you away from a technical or research-based role, you must learn to translate your experience into something accessible and valuable to a potential employer. Your background will have given you a range of highly marketable skills: critical thinking and analysis, knowledge management, problem solving and many others. Your challenge is to present these to the employer in an engaging and relevant way.

Using your skills in a specialist environment

The applications of physics knowledge are far-reaching. Physicists are recognised as being highly numerate, able to find the meaning in complex data and proficient at problem solving.

How do I decide which function will suit me best?

During the course of their career, most people are exposed to new situations and discover that they have talents or preferences that weren’t obvious during their scientific training. The range of skills developed by studying and working in physics, particularly those that relate to data analysis, critical thinking and identifying trends and themes, are sought after by employers in many areas, particularly the finance sector, which really values physicists.

Reflect on what you enjoy and are good at in these terms. Try to separate the skills that you are using from the science.

What is the appeal of using skills and knowledge outside research?

A common feature of many of these jobs is the intellectual challenge, which individuals doing them feel equals that offered by conventional research. You may also be drawn to the opportunity to apply skills that are secondary in your scientific role (managing others or developing new business), or to work in positions that involve more contact with people or customers. These tend to have a more commercial flavour, so they will require a much broader perspective of the world and a deeper understanding of economic pressures and the opportunities for scientists to engage in these.
Gaining insights

As for research roles, company websites are the best places to start researching and most carry profiles of staff and recruitment information. Once you have a good understanding, try to identify someone who can describe their role and the culture of their organisation. If you are interested in a particular employer, find out how they recruit. If there are local business networks available, consider attending meetings to build your knowledge of employers and understanding of wider business concepts. If you are looking farther afield, there are a number of IOP networks that will help you to meet physicists working in a range of industries. To build your commercial awareness, read more widely – (starting with the business pages of Physics World), then extend this to the trade journals of the functions that appeal to you.

Key messages

The range of employers and jobs described here is just a fraction of those that will value the knowledge and skills that you offer. If you are keen to move from a hands-on science role into a related function or a career that uses skills but not necessarily knowledge, it is essential to:

- identify typical tasks and activities in the area you are aiming for and provide evidence of carrying out duties of the same, or a similar nature;
- discover what the employer is looking for and redesign your CV, radically if necessary, to present relevant information;
- talk to people who have experience of the field of interest and ask their opinion about which elements of your background have value;
- tell people that you are looking for a change so that they can let you know about any opportunities they hear of;
- be prepared to take a number of steps to get into your preferred job;
- target a range of potential employers or internal departments and don’t be put off if some aren’t interested.

To start your transition in your current job:

- gain an additional qualification, if necessary;
- take on wider responsibilities, gaining relevant experience in financial management or customer-related roles;
- take a broader look at your research so that you are comfortable talking about your experience to a lay audience;
- take on new activities that expose you to external bodies or customers.
Real stories: Using your skills in a specialist environment

Name
Simon Singh

Initial career choice
I love television and I love science, so working on Tomorrow’s World seemed like an ideal job.

What were the circumstances under which you decided to change career?
I chose TV instead of a postdoc because I was not confident that I would be a high flyer in academia. Rather than be a second-rate researcher, I thought I would try to be a first-rate TV director. The reason I left TV after six years was simply the desire to find a new challenge. I was keen to move beyond my comfort zone. Even though writing is now my main job, I continue to seek out new challenges, such as lecturing. In the last couple of years I have experimented with lecturing to school audiences of 900 and presenting science shows in theatres in both London and New York. And even within writing I look for new challenges – my latest project is a book investigating the claims of alternative medicine, which I have co-written with a professor of medicine. It will be the first time that I have ventured into medical territory.

How did you decide on a new career direction?
I decided to aim for my ideal job in terms of what I enjoyed doing and the skills that I felt I had. A job at the BBC seemed like a long shot, but I felt it was worth a punt. The worst that could happen was that I would fail, in which case there would have been several other jobs I would have tried and enjoyed, such as teaching.

What were the main barriers or difficulties in changing career?
Working in TV is a very unstable job, and it was probably two years before I felt secure. Up until that point my contract was being renewed every six months or so, and I could see colleagues who were being forced to leave and start careers outside the media. But I was in my mid-20s and prepared for uncertainty.

What do you think convinced your employer to appoint you?
Having a PhD in particle physics made a huge difference to my job prospects. It meant that my CV stood out and made the BBC curious enough to interview me.

How did your education or previous career in physics prepare you for this job?
About 90% of my work is outside physics, but it always relates to science, maths or technology. Having been a PhD physicist, however, I understand how research works in general, and this gives me an insight into all of the other areas that I cover.

What advice would you give to someone interested in moving into this field?
I would probably advise against TV, simply because there are very few opportunities. Even if someone is hired then it might not be long before the contract runs out. Writing, on the other hand, is a much more forgiving career path. It is possible to marry writing with another full-time job, so you can try submitting articles while still being a researcher. If you are successful, then in time you could consider becoming a full-time writer.
Dr Alasdair Cameron

Manager of West of Scotland KTP Centre at University of Strathclyde

Previous occupation
Senior executive, Scottish Enterprise (previously various roles as an engineer in the semi-conductor industry)

Initial career choice
As I approached the end of my PhD at St Andrews it appeared that an academic career was beckoning. I decided that it wasn’t for me and that I wanted to work in industry.

My initial career choice wasn’t particularly well thought out. I wanted to apply the skills I had gained, but so many things interested me that I wasn’t sure where to start. I became a process engineer for Motorola, which was a great first move, although I did join the semiconductor industry as a period of fantastic growth was turning into an industry-wide recession. On reflection, working for a large multinational corporation allowed me to change vocation a number of times over the coming years without the need for large amounts of directly relevant experience. Since then I have become a serial career changer and I enjoy the new opportunities this brings.

How did you decide on a new career direction?
Recently I have tried to be more scientific about career choices and have spent time thinking about what I wanted to do. I found a book and it helped me to understand that what I enjoyed doing would be a good starting point for a career. Some self-analysis and thinking time gave me a set of criteria to rate any future job prospect against. This meant that I could quickly decide whether a job was right for me. I only wish that I had completed this exercise 12 years ago.

What were the main barriers or difficulties in changing career?
To me barriers apply to people who are looking for a reason not to try. If you set out looking for problems you’ll probably find them. I have found that confidence and a firm belief in your ability will convince others to “give you a go”. You do, however, need to make an extra effort to relate the skills and experience you have gained in previous careers to your newly chosen one. As time moves on, family and financial commitments make changing career seem even more daunting, but ultimately I believe that you need to be doing something you enjoy. If a change will help to make that a reality then it’s got to be the right thing to do.

After 10 years I left Motorola/Freescale to join the public sector, working for Scottish Enterprise. This brought new challenges and exciting opportunities that I could never have imagined. I am now about to change career again and work in the delivery of Knowledge Transfer Partnerships in Scotland – another exciting role with more challenges.

What were the circumstances under which you decided to change career?
Very early on in my university studies I realised that I liked knowledge. This led me to take courses right across the spectrum of physics, from particle and astrophysics to acoustics and mechanics. This desire for knowledge followed me into industry, where an early manager commented that I would need to watch that I didn’t get “bored”. From then on I recognised that I enjoyed different experiences and didn’t necessarily want to become an expert in a narrow field. I am a firm believer in always having an up-to-date CV so that if an opportunity looks interesting I’m ready to apply.

While working for Motorola I changed career a number of times as new opportunities arose. This has taken me from manufacturing to IT development and finally to marketing.
Real stories: Using your skills in a specialist environment

What do you think convinced your employer to appoint you?

Enthusiasm and personal belief have carried me a long way. In addition to this the ability to deal with change is becoming a recognised skill that employers will welcome, and I always ensure that this is highlighted.

Over the years I have heard a number of recent PhD graduates complaining that employers don’t recognise their unique skill set. I have often replied that the communication skills they think they have can’t be working very well because they have done a poor job of convincing the employer. When I applied for my first job I tried to figure out what the employer was looking for and sometimes actively played down my research and publication record. This led my first employer to comment that I “wasn’t what they usually expected from a PhD graduate”.

How did your education or previous career in physics prepare you for this job?

Physics taught me to ask questions. My background in physics helped me understand that in order to find the answer I had to ask the right question. Physics is a rapidly changing discipline and this helped me to develop my “no fear” mentality towards new ideas and problems. It has been commented to me that most technical knowledge within a business is redundant after 12 months and so an ability to learn, unlearn and relearn is key to your future success.

What advice would you give to someone interested in moving into this field?

Take time to understand what you want to do with your career. Whether you choose academia or industry you will end up spending a large part of your life working, so make sure it is something worthwhile and above all that you enjoy it.

It has been commented to me that the most technical knowledge within a business is redundant after 12 months and so an ability to learn, unlearn and relearn is key to your success.

Name  
Elizabeth Vokurka, PhD

Job title and employer  
intellectual property management and innovation consultant (self-employment)

Previous occupation  
postdoctoral researcher, image scientist, coordinator IP and funding, question setter and verifier, University Challenge
**Initial career choice**

After completing my PhD in particle physics, I changed research field and moved to medical imaging. There were two main factors behind this: CERN was about to shut down for the Large Hadron Collider (LHC) refit and the authors list was going to go from about 250 authors per paper to more than 1000 per paper. Also, for personal reasons, I became interested in medical imaging. I visited the professor in the division of Imaging Science and Biomedical Engineering every two weeks for a couple months until he acquiesced and gave me a job, and for three years I did MRI research for brain tumours, eye disease and spinal problems.

**What were the circumstances under which you decided to change career?**

Although there were opportunities in the medical imaging industry, these were all in the south and my partner refused to move farther south than Newcastle. A colleague pointed out an advert for a promising new medical imaging software company in Edinburgh that advertised “free fruit!” and was actively recruiting engineering staff. I applied and, while they knew I had little programming experience, I could be an asset to the company. I never touched a line of code. Instead I ended up helping to design a virtual colonoscopy application, applying for millions of pounds of government funding and ultimately helping to build and protect IP for the company which was bought out by Barco, a notorious supplier of the Eurovision Song Contest lighting/multimedia displays and the screens for AWACS planes.

**How did you decide on a new career direction?**

After the buy-out it became clear that I was never cut out to work for a big corporation. That, coupled with centralisation in Belgium of certain aspects of business and an interest in working part time, led me to choose a freelance career. This is currently quite successful, meaning that my “part time” has leaked into my days off, evenings and weekends.

When I had been looking for a job after my postdoc, an office mate suggested “research for the BBC” as a possible interesting career. Through some connections I got a chance to be an observer during the filming of University Challenge. When one of the science question setters didn’t appear, I found myself sitting in on a read-through of science questions over lunch with Jeremy Paxman, which resulted in a chance to prove my mettle as a question verifier and then setter. I still do it because I enjoy the variety.

**What were the main barriers or difficulties in changing career?**

I’ve never really taken too much notice of barriers. There are always ways around them, mostly involving some level of perseverance and proof that you can adapt. I estimated for the freelance work that it would take at least six months to be established and start seeing a reasonable income. It turned out that I was pretty much spot on.

**What do you think convinced your employer to appoint you?**

Word of advice: decide what you really want to do (feel passionate about) before you start looking for a job. It’s a lot easier to convince someone that they should hire you if you are convinced you want to do the job. I’ve never used a recruitment agency or actually applied for a job as advertised. I’ve always approached the people I want to work for and offered what I had to offer. It’s worked quite well so far.

When I changed research field, I persevered until funding became available. I showed them that I had thought about why I wanted to work with them and showed them how I could contribute to the group (specifically translating my skills in statistical analysis and pattern recognition from particle physics to medical imaging).

When I moved from academia into industry, I showed up at the interview with a demo of my academic research. It showed that I was probably a rubbish programmer, but I sure knew the field. I was told at my leaving do that they knew two things: I should never be allowed to code and they didn’t understand half of the stuff I was talking about but knew that they probably should write medical imaging software.

Now I’m freelance, my business depends on constantly convincing people to buy the services that I offer. The UK and particularly Scotland is a reasonably small business community. I had some contacts and worked hard going out to networking events to meet more. Most of my initial work came from people who I used to work with at Voxar who knew what I was capable of. It was relatively straightforward to build on those initial successful contracts by proving that I could genuinely help companies and organisations. The size of the community is now working to my advantage, with my reputation being passed on by word of mouth.
Real stories: 
Using your skills in a specialist environment

How did your education or previous career in physics prepare you for this job?

I think everything is in some way directly related to physics. While I was doing my PhD in particle physics and summer jobs in physics departments as an undergraduate, I was involved in computer programming, statistical analysis, pattern recognition, project management, creative/technical writing, teaching, hardware maintenance, electronics design and construction, operation of heavy machinery, interpersonal relationship management (sometimes along the autistic spectrum) and international business. Oh, and I can do sums too. Sums are good for loads of things. Being a physicist taught me how to think for myself and solve my own problems. With that grounding, everything else falls into place.

What advice would you give to someone interested in moving into this field?

The advice I would give is always do something that you are interested in. It’s a lot easier to be good at something if you are interested in it. Also, always try to be very, very good at what you do, whatever it is. Particularly in freelance consultancy of any kind, a half-hearted/unprofessional job is not quickly forgotten.

Name
Roland Harwood

Job title and employer
director – Open Innovation, NESTA (National Endowment for Science, Technology and the Arts)

Initial career choice
Immediately after finishing my PhD, the opportunity presented itself to spend some time working as a musician because I had been playing in bands all through university. I worked hard to promote some recordings, which led to getting work producing library music (background music for TV and film). It was lots of fun and I’m proud of what I achieved, but the music industry is massively competitive (i.e. I wasn’t really earning much at the time, though decent royalties came later), and the industry has gone through enormous flux over the past decade, so I decided after 18 months to go and get a proper job and put my physics degree to more direct use. I moved to EA Technology as a research scientist.

What were the circumstances under which you decided to change career?

I have had a number of roles over the course of my career, so there is no simple answer to that question. After three years at EA I moved into publishing, and then worked as a freelance project manager, before moving to the London Development Agency. Most of my career switches have been due to a lack of opportunity to learn and grow (i.e. I was bored). One career switch was motivated primarily due to money because I wanted to buy a flat, which I couldn’t afford at the time, but I regretted that decision pretty quickly.

How did you decide on a new career direction?

My primary motivation has been to find a role where I can learn something new and also one that uses both sides of the brain (analytical and creative).
What advice would you give to someone interested in moving into this field?

I'm not sure I really work in a field now per se. I sometimes describe myself as a specialist in non-specialisation. I do have some general advice for anyone contemplating a change in career:

• Keep on trying – don’t talk about it, do it. If it doesn’t work out, you can always change later, and taking a leap into the unknown every now and then is terrifying but a great opportunity to keep the grey cells active.

• Focus on your skills not your knowledge. Knowledge is much easier to acquire than skills (but demonstrate that you are a fast learner).

• Relationship building/networking skills are critical – these can be harder to develop but perhaps try to find a mentor and find out how others really perceive you (not always easy), and address areas that require development. Jump at every chance to learn, through training courses, conferences, etc if an employer is willing to pay for it.

• Try really hard to be clear and concise and talk about outcomes without going into excessive detail, though be prepared to elaborate if necessary.

• Really try to get inside their point of view and address it. Be very careful to avoid jargon, acronyms or language that they won’t know (scientists can be really bad at this in my experience) – nobody likes to have to ask what words mean.

What were the main barriers or difficulties in changing career?

Persuading people I was worth a punt (as I usually was) and explaining what value I could add to their organisation (because I normally didn’t fit the usual boxes).

What do you think convinced your employer to appoint you?

I was able to give them evidence of my ability to think analytically, creatively and flexibly. I also have curiosity and ambition that I could demonstrate, which meant that I could come up with new ideas and had the ability to get stuff done. There were also other more intangible factors, such as the way I presented myself and communicated my ideas, that are harder to describe. I think my energy and enthusiasm convinced them that I was going to have huge commitment to the job.

How did your education or previous career in physics prepare you for this job?

My training as a researcher developed my ability to observe patterns – a very useful skill in lots of industries/applications. Also, the PhD really hammered home the reality that there are no right or wrong answers at first – the point is to develop a series of testable hypotheses and then attempt to logically gather evidence – again, very useful in all manner of situations. In physics, uncertainty rules – embrace it. When you start work, you realise that the same principle applies and you can either become very insecure about where this leaves you or see it as a huge opportunity not to be constrained by the old concept of a job for life.

Another key physics concept is that there are many ways to get to a conclusion. I was struck by a lecture series (groups and symmetries) in my final year at Edinburgh by the famous Peter Higgs, which was eight weeks of hard-core mathematics, and I was amazed that the very last equation of the very last lecture was Heisenberg’s very simple Uncertainty Principal, which had already been demonstrated or proved to us many times in different ways throughout the degree, but never through mathematics alone. I think of this when I look at my career – there isn’t an obvious path from a physics PhD to the point I’ve now come to, but being flexible and open has taken me in a really interesting direction.

My training as a researcher developed my ability to observe patterns – a very useful skill in lots of industries/applications.
There’s the occasional late night, but they really are occasional. I work with a friendly group of people, which is much more important than I’d ever appreciated before. Although I’m just about to roll off the three-year graduate training programme (and qualify as a chartered accountant), it’s definitely not a one-size-fits-all programme. After a short learning period, responsibility is piled on as fast as you can take it. For me this has included everything from managing projects and client relationships to assisting with internal strategy and travelling out to Bangalore (twice) to train our UK tax team out there. Next week I’m off to New York for six weeks, on secondment to our US firm, after a competitive application process. I even ended up working briefly in our Christchurch office in New Zealand after I was stranded there for a week at the end of a holiday. There’s a lot more to the job than I expected.

Name
Alex Seeley

Initial career choice:
I’d previously worked in the City and after completing my PhD was still interested in business and finance. Strategy consultancy seemed like the ideal fit, giving me the chance to help companies to solve their business problems by asking the right questions, evaluating the various options in financial terms and making recommendations to management.

Why did you decide to change career?
I think I had been rather rash in my career choice and, though I had found a career with near-unlimited scope for intellectual challenge, I had neglected to consider quality of life. Working evenings and weekends was routine and I soon realised that this wasn’t a job but a way of life.

I definitely made the right decision with becoming a tax advisor. The work-life balance has been excellent.

I think I had been rather rash in my career choice and, though I had found a career with near-unlimited scope for intellectual challenge, I had neglected to consider quality of life.
How did you decide on a new career direction?

Initially I didn’t. I realised that twice already I had gone into careers almost by default. I decided that, if nothing else, I would take time to think about it this time. I spent nearly five months on DIY and home improvements, doing something productive but not forcing myself into a decision. I decided to look into the options for a career in writing about science – a field that had always interested me. I contacted science writer Simon Singh (You can read Simon’s profile on page 28), whom I had met previously, and, although he had no work available at the time, he eventually came back to me with a project. This was immensely enjoyable, but I decided that I wanted a degree of job security and recognition of my impact. Freelance writing couldn’t guarantee these, so I reflected on my previous experience.

At the time I was dealing with tax returns and, rather than being daunted, I found the intricacies very interesting. I realised that tax advisors make a profession of knowing, understanding and exploiting these intricacies to help companies of all sizes to pay less tax legally. The more I looked into it as a career, the more it appealed. When I discovered that, unlike my two former lives in the City, tax advisors tend to work normal office hours, I saw the chance to do a rewarding job that would not be all-consuming.

What were the main barriers or difficulties in changing career?

Applying for a graduate trainee programme at the age of 29 may have raised some eyebrows, and I had to convince potential employers that after a varied employment history I was serious about this career. I was able to show that I knew what I was getting myself into, that I understood the work and the study involved, and even that I would be happy to work for someone younger than me.

Although there were some challenges in joining a group of mostly 21-year-olds, it was infinitely preferable to joining no group at all, which had been a very disorientating way to start a previous career.

Another challenge was the exams – they were harder than I expected. Despite my four-year physics degree, and a distant memory of doing some securities industry exams in a former career, nothing had prepared me for the intensity of the second block of exams. For three months my life went on hold. The volume of learning was staggering. But it paid off when I achieved a “ranked” position in the exam results. It’s easy to forget how challenging that was, but having passed all 10 exams at the first attempt, I’m very glad I’ll never have to go through that again.

How did your education or previous career in physics prepare you for this job?

A physics degree is an excellent way to prove to a potential employer that you are numerate. This means much more than mental arithmetic (thank goodness for calculators!) and instead focuses on two skills that physics really does give you. One is order-of-magnitude estimation, which makes faulty data and miscalculations stick out like a sore thumb. The other is an intuitive sense of how a system is affected by its drivers – the input variables, such as kinetic energy or the price of steel. Without these skills, I’d be left with a “black box” where data go in and results come out, and a serious risk of not spotting junk coming out.
Real stories: 
Using your skills in a specialist environment

Erica Tyson

Initial career choice
I’ve always been good at maths and science and had an interest in how things work and why. My father is an engineer so it seemed a natural option. I did maths, further maths and physics A-level and then went on to an engineering science degree. I was interested in space and aerospace: Rolls-Royce offered interesting work and a prestigious organisation with a well defined development programme.

What were the circumstances under which you decided to change career?
I was involved in an education liaison project, and I enjoyed the activity and coordinating the group of us. It brought me into contact with the training department, who were actively recruiting people who “had done the job” to look after trainees. I also had a friend who was doing a training officer role for the Industrial Training Board and I had been envying her description of the work she was doing.

How did you decide on a new career direction?
A colleague told me that the training department was recruiting, this tied in with ideas I had been having about what I wanted to do in the future so I applied for the job and was successful.

What were the main barriers or difficulties in changing career?
There weren’t any barriers – as the training department wanted to bring people with engineering experience across into training and development roles. Once I had changed function there was some readjustment and I had to acquire new skills and qualifications.

How did your education or previous career in physics prepare you for this job?
I think my analytical skills and creativity have been useful, and that I understand the engineering community and can speak their language. I also spend a lot of time explaining how HR works to engineers. I believe that the fact that I still have a genuine interest and enthusiasm for the technical aspects that are important to the people I support is key to my success.

What advice would you give to someone interested in moving into this field?
If it is a change of direction that attracts you, you should find it straightforward to acquire new skills to add to those you have. I would recommend coaching and counselling skills training if you have not been involved in supervising people already.

Name
Erica Tyson

Job title and employer
engineering employee development specialist, Rolls-Royce plc

Previous occupation
my career has always been with Rolls Royce, starting as a graduate engineering trainee, then moving into a range of training roles until I became the training manager for engineering
Initial career choice
I chose to work in academia after my industrial career mainly because of the diverse international community that it offered and the interesting environment that this creates. I was able to do research in both industry and academia, but in academia you have more independence/control over what you are researching.

What were the circumstances under which you decided to change career?
I decided to change my career when my husband obtained a better job in another location. I decided to leave academic life because over the years it had become more and more stressful and the academic atmosphere had become too intense rather than stimulating. I wanted to have less stress and take care of my health.

How did you decide on a new career direction?
I mainly just looked to see what was on offer. The post for researcher development coordinator absolutely suited me as I enjoy coordinating and supporting people in their academic or other careers (as this is a part of academics job anyway). It interested me because the job gave the opportunity to see the “big picture” across the university. You work in all departments/schools and subjects and it was a terrific chance to see the broader academic world.

What were the main barriers or difficulties in changing career?
Adapting to the new job took about three months and there were not many difficulties. One challenge was to get used to looking at a broad vision rather than the narrow focus of my previous research and teaching. The other challenge was on a personal scale of dealing with intellectual snobbery from a few of my previous and new academic colleagues. I highlight that this was just a few!

What do you think convinced your employer to appoint you?
My knowledge of academic life, teaching, supervising and research experience, plus my coordination skills – these I feel were the main attributes to obtaining the job.

How did your education or previous career in physics prepare you for this job?
My education in physics has prepared me for all of the jobs that I have undertaken. Physics training – especially the hours of lab work and writing reports – gives you an analytical ability that you can use for any data and situation you are presented with. It also means that report writing is a natural thing to do and it allows you to record your work and findings clearly and logically so that others can follow whatever you have done.

What advice would you give to someone interested in moving into this field?
The field of researcher development is a great job because you spend time with the new researchers of the day who are full of energy and optimism and you can’t help being carried along with their enthusiasm. The presenters and trainers you meet are also full of creative ideas. It was great to rediscover my creative side, which unfortunately had become a little lost under academic stress.
If you are ready to broaden your career and to use the skills that you have developed from studying or working in physics as the foundation for a new non-scientific or technical career, here are some key pieces of advice extracted from our case-studies and careers professionals.

**Key points:**
**Using your skills in a specialist environment**

### Qualifications and knowledge
- Carefully rewrite your CV to emphasise relevant skills and play down the scientific jargon unless it has value to the new employer.
- Try to develop additional relevant skills, such as team-working, delivering presentations or project management.
- Research the entry requirements in the job that interests you – some will require postgraduate diplomas before you will be considered, but in some areas on-the-job training is offered.

### Get clued up
- If you are working at a university, look out for visits from employers (although these are part of their graduate recruitment programmes, you should be able to attend and chat to staff); find out if the careers service offers any support to staff.
- Broaden your reading to include trade manuals or introductions to the principles behind the jobs that interest you.
- Talk to people in these functions about their day-to-day role and compare the skills that they are using with your own expertise.

### Practical steps
- Look for introductory training for specific functions (marketing, finance, training) that may be offered by the relevant profession’s trade organisation.
- Arrange some work shadowing or get involved in voluntary activities that will give you relevant experience (managing finances, writing websites, science promotion).
- Tell everyone in your network about your career interests and ask them for advice or contacts.
Something completely different

A background in physics doesn’t have to mean a future in physics. If you feel that your career interests are likely to lie away from science, then the opportunities are limitless.

What’s the appeal of doing something different?

In the early stages of a career, the qualifications and the work experience that you have seem to be the main defining factors in your career choice. The reality is that your degree and a few years of work experience are a small fraction of your working life, and if you aren’t happy or fulfilled it is far better to redirect yourself towards something that fits in with your personal motivations and interests.

Sticking with a job that doesn’t inspire you will do your career (and health, potentially) more damage than having to go back to the beginning and start again. It is incredibly difficult to be effective and productive when you are dragging yourself into work each day. Try to think about how energising it would be to do a job that is important to you and that you have a natural ability for.

If you already know what your ideal career is but feel that you have committed to a different path and closed off those options, think again. Whatever stage you are at in your career or life, you can start a new chapter and use a different set of skills or interests as the basis of a more fulfilling career.

If you already know what your ideal career is but feel that you have committed to a different path and closed off those options, think again.
I had committed myself to something that felt like a vocation and then I realised that it wasn’t for me. I am sure that the emotional trauma that I felt moving away from that vocation is exactly what many other people feel when they make a major change in life.

The decision to move away from hands-on television production was prompted partly by market conditions. Most of my TV production company’s clients were US broadcasters, such as the Discovery Channel. Their phenomenal growth in the late 1990s was all fuelled by advertising for dot.com companies. When that all disappeared overnight in the first quarter of 2000, so did our contracts.

The experience of having to lay off staff and coping with an acute cash-flow crunch for the first time in business was horrible at the time but it taught me more about business than the years of profit. We didn’t go bust and everyone got paid, but I can mark the moment when I became a real entrepreneur as the moment when I got back off the ground after that difficult time and started another business – my present company, Pembridge Partners LLP.

How did you decide on a new career direction?

In each case the career choice has felt like a conviction rather than a rational choice. I had a passion for science, so I tried being a scientist. I wanted to share that passion with millions of people, so I became a science communicator with the independence that comes through running your own business.

In my spare time I became very involved in student journalism, hospital radio and other kinds of media. I graduated with a degree in physics with physical electronics from Bath University in 1989, still fascinated by science but knowing that doing it day to day wasn’t for me.

Subsequently I chose to go into science film-making because I was interested in the creative craft of film-making, storytelling and writing, and because I believed that there were many fascinating stories to be told about science that the public deserved to hear. Looking back I think I had a touch of the evangelical zeal that I see in many other scientists-turned-communicators.

My choice in 2000/2001 to become a full-time entrepreneur/investor came about when I realised that the opportunities to make thought-provoking television were diminishing, my personal need to make some serious money was growing and there was the opportunity to share with others what I had learned about running a business.

What were the circumstances under which you decided to change career?

I vividly remember the moment when I gave up physics/engineering. I was in a maths tutorial in my first few weeks as an undergraduate and I thought to myself: “I hate this. This is so dry. It’s not what I want to do.” I walked out of the seminar there and then, went and found a student counsellor and burst into tears, saying: “I don’t want to be an engineer.” She gave me a Kleenex and said: “That’s ok, there are other things that you can do with your life.” Every few years I check she’s still working and well and I send her a thank-you letter. So that transition was really about a growing realisation that I had committed myself to something that felt like a vocation and then I realised that it wasn’t for me. I am sure that the emotional trauma that I felt moving away from that vocation is exactly what many other people feel when they make a major change in life.

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Real stories: What’s the appeal of doing something different?

Name
Hugh Mason

Job title and employer
partner, Pembridge Partners LLP

Previous occupation
director of TV production company, assistant, producer, technical writer

Initial career choice
My first career choice (at 18) was based on my teenage nerdy passion for electronics. I built my first home computer at age 13 and got my amateur radio transmission licence at 14. I felt that working in science would bring me closer to “truth” in a cosmic sense and that it would be an environment in which I could help to shape a positive future. Of course, it can do these things, but it needs patience, which is not one of my talents.

In my spare time I became very involved in student journalism, hospital radio and other kinds of media. I graduated with a degree in physics with physical electronics from Bath University in 1989, still fascinated by science but knowing that doing it day to day wasn’t for me.

Subsequently I chose to go into science film-making because I was interested in the creative craft of film-making, storytelling and writing, and because I believed that there were many fascinating stories to be told about science that the public deserved to hear. Looking back I think I had a touch of the evangelical zeal that I see in many other scientists-turned-communicators.

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In each case the career choice has felt like a conviction rather than a rational choice. I had a passion for science, so I tried being a scientist. I wanted to share that passion with millions of people, so I became a science communicator with the independence that comes through running your own business. Finally, I realised that all of those years of independence now gave me an attitude that made me unemployable in a “conventional” sense but also gave me the confidence and maturity to start growing a “proper” business with others.
What were the main barriers or difficulties in changing career?

In becoming a TV producer, over-supply in the labour market – i.e. there are far more people who want to do the job than there are jobs to be done. I overcame that through persistence and by selling myself as something different – a scientist who could also communicate (TV is dominated by arts and humanities graduates).

The move into television wasn’t straightforward. I had worked briefly at the university in its audiovisual department learning some of the craft skills before moving on to become a writer for a technical public relations consultancy. Persistence at this stage means that I badgered people for a period of around two years. I finally got a break into television and became an assistant producer for BBC science and features working on Tomorrow’s World. Two years later I got to make my first complete films for BBC2.

Looking at the transition I made to become an entrepreneur, I realise that the barriers were psychological and I overcame them in a series of steps, which I would characterise as follows:

Step 1: Going freelance, i.e. moving away from relying on an organisation to look after my future personal cash-flow and career development, seemed like a huge step at the time.

Step 2: I now see that setting up a real business, where I employed others, was a larger step. I say this because, like it or not, when you start hiring you also start becoming all sorts of things you don’t necessarily want to be – a mentor, that guy who isn’t giving you the breaks you deserve, the person who should care more about your dog being sick and that’s why I’m late for work again, etc).

Step 3: The moment when I started hiring other people to do the sales function in the business was another critical moment because that is when I started handing over responsibility for the real core of our future to someone else.

Step 4: When I took external investment into my business, and so acquired obligations to others for quite serious chunks of cash, was also very sobering.

Step 5: As mentioned in step 1, the moment when I moved on from a very difficult time to set up another business rather than going back to being an employee was probably the moment when I “graduated” as an entrepreneur.

What do you think convinced your employer to appoint you?

The folks who are now my partners in Pembridge invited me to join because I’d proved myself as an entrepreneur; I was available and had a set of skills that were useful to take us forward. Bizarrely, as we got to know each other we realised that three out of eight of us had physics degrees (though none of us had practised physics when we graduated).

How did your education or previous career in physics prepare you for this job?

Three aspects of my education in physics stick with me. First, comfort with numbers and having a clear mental picture of how to see the model that relates different parameters. Second, I think physics teaches you to ask questions that can be answered (though it has a rather arrogant tendency sometimes to dismiss the rest as worthless, which I have come to realise is short-sighted in life). Finally, when I was working day in day out with researchers, I learned how scientists think and speak to each other, and that was a great benefit in building up a rapport with them as a film-maker.

What advice would you give to someone interested in moving into this field?

I would advise someone wanting to go into the field of science communication to focus on storytelling – writing – above all else. Both journalistic skills and creative writing skills are valuable.

I would advise someone considering a move into investment, developing small business or technology transfer to take a year and set up your own business with a friend. One of you needs to be the technical/creative one and the other needs to be the business/sales one. Preferably your business partner should not be a life partner. It doesn’t matter if it’s a corner shop or a consultancy; a web-based service or a technology start-up: nothing will teach you more about the real issues involved in growing a business than trying to do it with someone else. You need someone else to make it fun and to keep your motivation up. If you don’t know someone, advertise. Contact Business Link and ask them to help you to find a local business incubator unit that can help you to learn to run your own company (you may find there are grants available to help you with the financial risks too). Don’t bother with an MBA or further academic work unless you want to go and run large corporations or to become a hardcore management consultant.
Real stories:
What’s the appeal of doing something different?

Name
Eleanore Lyons

Job title and employer
medical student,
University of Nottingham

Previous occupation
chartered accountant,
Deloitte and Touche

Initial career choice
Accountancy appealed because I liked the problem-solving aspect of my physics degree but also wanted to make sure that I got lots of people contact out of my career. By training along the audit route I knew I would see many different types of business and learn how they work. I wasn’t entirely sure about my long-term career direction and I thought that I couldn’t go wrong picking up such a prestigious qualification (ACA) along the way.

What were the circumstances under which you decided to change career?
Although accountancy is certainly a challenging and interesting career, contrary to popular belief, I really felt that I wanted to do something that was more personally rewarding and that gave me more job satisfaction. I also really missed science. Accountancy is a challenging career, but at the end of the day the rules are very man-made – I missed the element of discovery in science.

How did you decide on a new career direction?
Medicine is a career that I had been thinking about for years and I started to do work experience in hospitals and GP surgeries to see what it was really like to be a doctor. I also talked to several doctors from house officer through to consultant in order to get as many different perspectives on a career in medicine as I could.

The more I saw and heard, the surer I became that medicine was the career for me. It combines science and problem-solving with the people contact that I enjoy, and I am really excited about the privilege of being trusted to help people in whichever area of medicine I end up.

I’m now about a year away from my final clinical placement and I definitely still feel I made the right decision. It was something that I would have never stopped thinking about if I hadn’t given it a go. I’ve been really enjoying the course, though it’s definitely had its tough moments. The first year and a half (pre-clinical) absolutely flew by and I loved every minute. I feel so lucky to have this opportunity now.

I would say – if you are not happy in your current career and there is something else you fancy, just go for it!
What were the main barriers or difficulties in changing career?

Money! And peer pressure to a certain extent.

It was difficult having a career crisis in London when all of my friends are lawyers, accountants and PR consultants, settled in their careers, earning nice salaries and enjoying a great lifestyle. It was daunting knowing that I would be giving this up to be a student for four years and putting myself back into debt. These last six months I have started to feel the pinch with money – especially when I see my friends who are accountants (who I trained with) and see the lifestyle I could have. But on the whole I know I am really lucky to be doing something that I really enjoy.

It is also quite scary knowing that I will be 30 by the time I finish my degree (and that’s on the fast-track course), and that at that point I will be the lowest of the low in the medical profession and will have to start afresh building my career. If I had stayed in accountancy I would be well established by that age.

How did your education or previous career in physics prepare you for this job?

The problem-solving skills that I developed during my physics degree have definitely helped in the area of diagnosis, because this is very much a problem-solving exercise.

What advice would you give to someone interested in moving into this field?

I think the advice that I would give to anyone who is considering a change in career would be to analyse what you do and don’t enjoy about your current job, so that you can judge other careers on the right criteria.

Then, if possible, gain work experience in the field you are interested in, because it is invaluable for getting a good idea of what it would be really like.

Finally I would say, if you are not happy in your current career and there is something else you fancy, just go for it! Although this has been a demanding few years, the sense of privilege to be doing this course has not left me. Attending the delivery of my first baby was one of the most memorable moments, and, I have to confess, I cried.

When I think about where I would have been if I had stuck with my safe, secure job instead of taking this opportunity, it really brings home to me that life is too short to waste on being miserable in your job.
Real stories: What’s the appeal of doing something different?

Initial career choice
My degree was in natural philosophy at Aberdeen University, which gave me a wonderful start to my career because it used physics as a way to question the universe and life. From this my career started in a scientific direction, working at the Meteorological Office. I was initially in research but moved to forecasting and worked at a range of weather centres.

What were the circumstances under which you decided to change career?
I was offered a five-month placement with the British Antarctic Survey. When I was there I had a lot of time to think about the direction my career had taken and I realized that I wanted to leave the rat race.

How did you decide on a new career direction?
I loved sailing and thought that managing a marina would give me a chance to develop some new skills while having the opportunity to be near the water and having more freedom and time to sail. I knew it was likely to be a one-way move and I wasn’t sure where it would take me in the long run, but I knew I had to change my working life.

What were the main barriers or difficulties in changing careers?
Mostly financial – I was giving up a long-term, secure career with a great pension. I also had to deal with resistance from my parents, who were worried about the long-term implications of what I was doing. There was also the challenge of trying to persuade the marina owners that the skills I had developed at the Meteorological Office were transferable, and justifying the career change that I was trying to make.

What do you think convinced your employer to appoint you?
I sent my CV to all of the marinas in Argyll and the Scottish Highlands and, at the start, heard nothing. Eventually one of the owners was willing to take a risk on me. He saw the potential I had and I think the fact that I was honest about my lack of experience along with the slight cheek I had shown in thinking I could get a job as a manager all added up and he offered me the job.

How did your education or previous career in physics prepare you for this job?
It wasn’t directly useful at the marina, but in the jobs that have followed they have given me a lot of credibility and were very useful when the job in the marina became less of a challenge and I was looking for my next job. As a scientist you are trained in different ways of thinking – we tend to be analytical and to accept different viewpoints. I’ve deliberately looked for cultures to work in that are open to this.

What advice would you give to someone interested in moving into this field?
If you are thinking of making some drastic changes to your career, have confidence in your own decisions – you know what is best for you. Give a new direction a try – even if it doesn’t turn out to be the perfect career for the rest of your life, it will lead to new opportunities and help you to develop new skills.
If you want the next stage of your career to go in a completely new direction, here are some key pieces of advice extracted from our case-studies and careers professionals.

Qualifications and knowledge

- Write a CV based on skills and any direct experience, even if this means playing down your qualifications and scientific experience – give greater weight to voluntary work or hobbies if these are more relevant.
- Find out what entry criteria you need to demonstrate and be willing to finance your retraining.
- Remember that a background in physics can be intimidating to people, so describe your experience and qualifications in straightforward language, emphasising the value of your training to the new career area.

Get clued up

- Talk to a careers professional and get feedback on your application or CV.
- Broaden your reading to include trade manuals or introductions to the principles behind the jobs that interest you.
- Talk to people in these functions about their day-to-day role and compare the skills that they are using with your own expertise.

Practical steps

- Always contact a potential employer before submitting an application. Develop a strong argument to convince them that you are serious about the career change and can meet the demands of the role.
- Arrange some work shadowing or get involved in voluntary activities that will give you relevant experience (managing finances, writing websites, science promotion) and give your career change more credibility.
- Tell everyone in your network about your career interests and ask them for any contacts or advice.
- Investigate career-development, loans and other funding sources for retraining, if required.
Making it happen
As you've read through the stories from successful career changers, you have probably started to identify good ideas that will apply well to your own situation. There is space here to capture and personalise those as well as adding any additional advice that you've been given during your research. To ensure that the advice from all of the people interviewed for New Directions is easily accessible, it is presented here as a set of quick tips. These are practical steps that you can take in developing your career and making change happen.
Making it happen
This advice has been drawn from the many physicists who have shared their experiences of career change, but it will only have an impact on you if you are ready to make this change and are willing to commit your time, effort and energy.

Effective communication
Make an impact

Your checklist

- Use job descriptions and adverts to gain a clear picture of the employer's needs and ensure you present your suitability clearly.
- Spend time making your CV visually impressive and experiment with different formats (columns, sections, appendices).
- Prepare for interviews and practise phrasing evidence of your suitability.
- Research the organisation and ensure that it is consistent with your needs.
- Speak positively about your previous experience and have constructive reasons for any constraints (i.e. geographical preference means that you have settled in the area, without relocation needs or potential problems).
- Find matches between your background and the employer's needs, particularly in areas where traditional candidates might be weak – see the differences in your experience as positive.

Network creatively and effectively

Your checklist

- Make a point of speaking to influential figures at conferences (if planning to stay in research), IOP events or in other environments, or contacting them by e-mail.
- Understand the broader context of your work and its relevance in a wider sense.
- Take advice from experts – use your old university careers service (many offer services to graduates for five years after graduation) or the IOP careers advisor.
- Get a mentor – use the IOP service if you need support.
- Understand what you are looking for in a job and articulate this to people who might help you.
- Identify people who are successful in the field that interest you and make contact with them.
- Find out what the current and future challenges are in the positions that interest you and use these insights to market your experience and skills.

Persuade and negotiate

Your checklist

- Understand what employers are looking for, anticipate any concerns they may have about employing you and reassure them of your suitability.
- Commit yourself to a programme of self analysis to identify all of your skills, preferences and values.
- Research each opportunity systematically, looking at the market in which the organisation operates and its competitors, strengths, weaknesses, opportunities and threats.
- Identify typical salaries and benefits packages. Decide on a salary range that reflects your skills and experience, and prepare your argument for being awarded this.

Apply scientific skills to career management

Critical judgement and analysis

Your checklist

- Don’t take rejection personally. Get feedback if you don’t get an offer and act on it.
- Be methodical in applying for jobs. Keep records of the progress of each application and review regularly.
- Have a clear idea of what you want from a career and don’t compromise this.
- Define yourself in terms of skills rather than a job title.
- Be realistic about your chances of moving into a new career and weigh up the risks of starting in more junior positions.

Creativity and lateral thinking

Your checklist

- When searching for jobs, look in a variety of publications, and use the internet and take advice from many people to broaden your horizon.
- Build a portfolio of skills and evidence and update constantly.
- Seek out influential people on all possible occasions and through your network. Present yourself to them with confidence and enthusiasm.
- Take on new projects or responsibilities in your current job or through voluntary activities to broaden your experience.
**Strategic thinking**

**Your checklist**
- Identify where you want your career to be, the obstacles that stand in your way and the driving forces that will help you to succeed.
- Research the markets and political environments in organisations and analyse any comments made relating to these.
- Build a support network by working with colleagues also seeking career change.
- Write down your goals and plan out the steps you need to take to move towards them.

**Invest in yourself**

**Your checklist**
- Use work shadowing to immerse yourself in an organisation and its culture.
- Take support from career professionals, family members or other trusted figures.
- Look for evening classes or distance-learning qualifications to demonstrate the acquisition of new knowledge.
- Alternatively, develop new skills and knowledge in your own time (website development, voluntary work).
- Identify areas for development and keep a written record of the training, external work experience, and development opportunities you have undertaken. Set time targets for achieving improvements.

**Manage yourself**

**Enthusiasm and optimism**

**Your checklist**
- Be realistic about what you can achieve while continuing to work full-time. Set challenging, but not unrealistic, goals.
- Always talk positively to potential employers or influential people – they may interpret your difficulties as being your shortcomings rather than the result of other people.
- Manage your time and projects effectively. Seek training if you need to develop these skills.
- Balance the effort you put into finding a new job with some downtime and ensure that you spend time each week doing things you enjoy.

**Tenacity**

**Your checklist**
- Set aside time to identify new opportunities each week and have a target of making a set number of applications a month. Try to have applications in the system to give you momentum if you face rejections.
- Build time to complete applications and prepare for interviews into your working week without compromising your research.

**Open-mindedness**

**Your checklist**
- Ask for advice from your mentors, careers professionals and other trusted sources and act on it.
- Get feedback from interviewers if not successful and use this in future preparations.
- Be prepared to apply for unusual jobs if they have some appealing aspects – you can always reject an offer if it is not what you want.
- Talk to people in other sectors about their experiences and careers.

**Self-confidence**

**Your checklist**:
- Invest time in self-analysis using a variety of tools.
- Look at your career in the long term and consider less attractive jobs that might help you to reach your ultimate goal. Have clear long-term goals.
- Identify the unique things that you can offer to employers and gather evidence of the impact that you’ve made in your current or previous jobs.
- Don’t dwell on rejection or take it personally, but do learn from each experience and change your behaviour, if necessary.

**Determination**

**Your checklist**
- Commit time and effort to finding the right career.
- Don’t wait for opportunities to appear as adverts – identify potential employers and seek them out.
- Use professional advice and look for training opportunities and support from professional bodies and funding bodies.
- Approach career management with dedication – apply your time-management skills, don’t cut corners and don’t rush applications or research.
Talking to people about their work (known as information interviewing) may seem daunting, particularly if you are unfamiliar with the field and don’t have obvious contacts. This section offers advice on the process.

Who is out there?
The first hurdle is working out who the people you should be talking to are. Think about what is missing from your understanding of a new career and look for people who can fill in the gaps. This might mean talking to someone who works for a company you are interested in (they can tell you about company culture and structure, whatever role they play), someone who runs their own business (for insights into financial systems and support for new businesses), someone in your current organisation in a different role (provided they can be discrete) or someone who has the same background as you (to explain how they made their career move). Have an open mind about the information you can gather by talking to people.

Making contact
Starting with friends, family, colleagues and former employers, ask people for referrals. Use the networks you may have forgotten you belong to – including your university alumni office and the Institute of Physics. Look for professional organisations representing the new career that appeals because they may have career contacts or be willing to connect you with members. Start browsing websites and newspapers for the names of people who you feel will have information or opinions that will be of value. The closer the connection, the more likely you are to be successful in persuading someone to talk to you, but most people are surprisingly happy to talk about their careers.

Preparation
Before making contact, ensure that you have found all of the information that is publicly available. If you ask questions that could have been answered by five minutes browsing a website, you will lose credibility and irritate the person who has given up their time for you. Prepare a list of questions and have an up-to-date copy of your CV or a completed application form for the organisation or job, because your interviewee may be able to give feedback. Remember: you are not asking for a job. If people think you are, they are much less likely to be willing to meet you. You are asking for information and advice. Expect to meet someone for about 20–30 minutes and dress as if you were going for an interview.
Questions
The job, your background and what you are looking for from your career will determine the questions you ask, but here are some suggested areas to cover.

The role
What are the typical activities in your role?
What do you enjoy most about it?
What are the less appealing elements?
Which skills are most valuable?
Where do you see your job going in the next few years?

The organisation
What do you like about working here?
Is there anything you would change?
Are there opportunities to work part time? (if relevant)
What would a new starter in this position expect to earn?
What are the challenges facing the organisation in the next few years?

Getting in
What did you do before joining the company/moving into this role?
What helped you to secure the job?
What do you tend to look for?
How do you recruit?
Who should I talk to if I wanted to apply here?
What kind of experience would help someone get a job in this area?
What do you think I should do to make myself more employable?

Moving ahead
How long do people tend to stay here?
What are the criteria for promotion?
Are there regular opportunities for promotion?

Further information
Where else could I look for jobs in this area?
Is there anyone else you think I should be talking to?
Would it be possible to use your name when I contact them?

Afterwards
Reflect on the information that you’ve gained and the questions that you’ve asked – what gaps remain in your understanding? Write and thank the person you saw. Explain how meeting them has helped you and let them know what you plan to do next.
Your career planner:
Space to plan your own career move

What do you enjoy in your current job and what do you dislike?

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What do you want to contribute to your workplace?

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What motivates you?

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What are the constraints on your working life?

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Stop and think – do you need to change employer?

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Which employers and which jobs would meet your needs?

If you can’t identify specifics here, list the characteristics of an ideal job or employer to compare with potential offers.

Which jobs appeal to you?

Even if it isn’t realistic to pursue them, this may help you to identify constraints and clarify your thinking about what you want from a career.

What steps are you going to take to change your career?

Immediate steps (within three days)

One month from now

Three months from now

Six months from now

What support do you need from other people?

List the people or organisations that you can contact for this.
Resources: Selected for physicists

Below is a selection of some of the books and online resources that we feel will complement this guide. Website addresses can change, so if you have problems finding a site, contact the Institute for advice.

The Institute’s website carries a range of careers resources and materials (www.iop.org/careers).

Career change books

How to Change Your Career, The Careers Group (available to order online from www.careers.lion.ac.uk/output/Page90.asp). Highly recommended.


Skills analysis and self awareness

The Research Career Builder (http://gmpcrs.group.shf.ac.uk) is an extensive analysis tool developed specifically for researchers. It includes a skills matrix to measure the level of your existing skills and advice on how to develop skills needed for your future career stages. Although developed for those wishing to stay in academia, it is an extensive skills audit for those with academic research experience.

What Am I Like? (www.bbc.co.uk/science/humanbody/mind/surveys/whattamilike/index.shtml) is a simplified version of the Myers–Briggs personality indicator, which is used worldwide by organisations and individuals to help people to achieve their potential.

What Color is Your Parachute (www.jobhuntersbible.com) is one of the best-known job-hunting books and its sister site has excellent advice, contacts, interactive tests and articles. It tends to be US focused but is still highly rated.

Life Work Transitions.com (www.lifeworktransitions.com/exercises/exercs.html) is a career manual supported by a website. Among the many activities are exercises to help you to identify your personal motivations and interests, and to develop a career plan.

The Windmills Programme (www.windmillsprogramme.com) includes many career-management strategies and exercises aimed at people who feel that they are underemployed and unfulfilled at work.

New Life Network (www.newlifenetwork.co.uk) helps people to find a new career direction, particularly after redundancy. A positive and well written resource with many articles and resources.
Identifying possibilities

Science Careers (http://sciencecareers.scientmag.org) has an extensive bank of articles on a range of careers.

The Prospects Planner (www.prospects.ac.uk/Planner) helps you to clarify your ideas. You answer some questions about your skills and what you want from a job, and Prospects Planner suggests what might suit you.

Researching possibilities

Prospects (www.prospects.ac.uk) has a staggering range of job profiles (look under “Explore Types of Jobs”). Each links to further information and related jobs so that you can quickly build a list of potential careers to investigate further.

The Careers Group’s Online Careers Library (www.careers.lon.ac.uk/output/Page178.asp) has well ordered and researched links on all careers topics.

Inside Careers (www.insidecareers.co.uk) produces a set of 10 careers guides covering financial and professional occupations.

Careers Match (www.careersmatch.co.uk) is a career-matching programme. For a small fee you get a week’s access to the resource and a personal report based on your answers to their questionnaire.

Making your move

Science Careers (http://sciencecareers.scientmag.org) carries many articles about interviews and recruitment processes.

Tailored advice for PhD Students and Postdoctoral Research Staff (www.vita.ac.uk) from VITAE includes sample interview questions, example CVs and advice about information interviewing and networking.

Shinton Consulting (www.shintonconsulting.com) the website of the author of this guide, contains these and many other links and resources for researchers and scientists.

Finally, good luck with your career changes, whether they are major or minor.
This booklet has been developed to offer practical support to help you to get the job you aspire to. In it you will find a range of resources, including:

- career stories and advice from physicists who have changed their career directions;
- a career-change framework to help you to create a personal action plan;
- links to resources relevant to physicists and career changers;
- a framework for you to develop your own tailored career plan.

We hope that you find this guide interesting and useful.