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## Early career profiles of STFC PhD students

April 2010

ability **able** acquired analysing analytical background  
business career collaborators communication competitive complex  
computer current data deal **developed**  
different **essential** field finance gained helps  
important information **job** knowledge  
mathematical modelling particle **people** period **phd**  
physics problem professionals provided qualification  
research **skills** software systems  
technical think today **training** understand  
**work**

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## Acknowledgements

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# Contents

<b>Introduction</b>	1
<b>Destinations of former STFC students</b>	1
<b>Career profiles</b>	2
<b>Private Sector</b>	
Project Manager / Senior Software Engineer, Tessella	2
Software and Digital Engineer, Tandberg	3
<b>Government and public sector</b>	
Investment Policy and Analysis Manager, Office of the Rail Regulator	4
<b>Universities and Research Establishments</b>	
Marie Curie Fellow, University Of Birmingham	5
Data Centre Scientist, University of Leicester	6
Post Doctoral Scholar, Las Cumbres Observatory, USA	7
Post-doctoral Researcher, Max Planck Institut für Astronomie	8
Reader, Department of Physics, Durham University	9

## Introduction

In 2009, the Science and Technology Facilities Council (STFC) commissioned DTZ to find out about the career paths that former PhD students have followed and how they have made use of the skills they developed during their study. More information about study is available from the STFC website.

One of the aims of this project was to gather a number of career profiles. These explore in more detail the paths followed by individuals since finishing their PhD and the skills they use. The former students who responded were also asked what advice they would have for current students. These profiles complement the data collected from the career path survey and career profiles from former students who were now 10 to 14 years into their post-PhD careers.

Respondents were asked whether they would be willing to provide material for career profiles covering:

- career history from completing PhD
- current employer and what the job involves
- use of the skills acquired during their PhD in their current role
- any advice they would have for current PhD students in planning their careers

## Destinations of former STFC students

The 2009 survey, indicated that 46% of the former students who responded were working in universities, 27% in the private sector and 23% in other government or public sector organisations.

Of those employed in universities, 32% were lecturers or senior lecturers and a third were working outside the UK.

In the private sector, about three quarters worked in business or financial services: in investment banks, money market traders, fund management companies and companies providing management consultancy services. Former students also worked for large business systems companies and a minority worked in manufacturing companies.

Of those working in the public sector, half worked in UK or international research establishments. Most of the remainder were working in central or local government and schools or colleges.

## Bruce Fairley, Project Manager / Senior Software Engineer at Tessella Plc

PhD: Observational Astronomy and Cosmology, University of Birmingham, 1997 to 2001



“Start thinking about your career options earlier than I did! Unless you think you have a good chance to secure a follow-on position, you will need to start thinking about alternative opportunities and it takes time to find out about jobs in sectors you are not familiar with. Do not rely on employment agencies to do this.”

### Career Path

I was undecided at the end of my PhD whether to stay in academia or not. There were few post-doctoral positions in my research area in the UK. There were more opportunities in the USA and I was offered post-doctoral positions there, but ultimately I decided that I wanted to remain in the UK. That was when I began to look at job opportunities in the private sector.

I had undertaken a lot of data analysis and computer programming work for my PhD which I had always enjoyed, and I started to look for a way of using these skills in the private sector. Ideally, I wanted to work with scientific software as opposed to general software because this would combine my interests in both science and computing.

I signed up with an employment agency to identify relevant opportunities but little came from this. The best opportunities turned out to be the ones I researched and identified myself. I knew about Tessella because they sponsored a software prize at the University of Birmingham and one of my friends had gone to work for them. I joined the company in May 2001 and have worked for them ever since.

### What I do now

The company designs bespoke scientific software. We diagnose problems that clients in the scientific sector are experiencing and write bespoke software to address them. Thus, there is a consultancy role as well as a programming / delivery role. I joined the company as an associate analyst programmer and now I work as a project manager / senior software engineer taking greater responsibility for all aspects of client projects.

### Skills

The technical side of my PhD training, such as analysing images from telescopes is of limited relevance to my current job. However, I still use many of the other more general skills I developed through my PhD, in particular, analytical, programming, proposal writing and presentation skills. As an astronomy PhD student you spend a lot of time writing proposals for telescope time. This type of experience is highly relevant in the private sector, where a lot of time is also spent writing tenders and proposals.

My experience is that there are interesting, rewarding jobs for STFC postgraduates in the private sector but you have to put time into finding them yourself.

## Simon Robbins, Software and Digital Engineer, Tandberg

### PhD: Particle Astrophysics, University of Oxford, 2000 to 2004

“ Current STFC PhD students have an enormous range of career opportunities. Physicists with high-level computing and quantitative skills are highly sought after by employers in the software and business services sector.”

#### Career Path

During my PhD I worked on the HARP experiment at CERN and simulations of atmospheric neutrino production. I then held a three month post-doctoral research position at the University of Oxford, followed by a two year research position with the Astro Particle Physics Group at the University of Wuppertal in Germany, where I worked on the IceCube Experiment and Pierre Auger Observatory.

For the last three years I have been employed by Tandberg (a video conferencing equipment manufacturer) in Software and Digital Engineering, initially as a junior developer.

#### What I do now

After two years, I became responsible for the platform team (3 staff then, but now 10) which works on architecting and developing new platforms in partnership with the hardware group. This involves software engineering, operating systems, network stacks, and digital design for field programmable gate arrays.

My greatest achievement has been getting my first platform to ship as a product. I was responsible for the platform development and jointly responsible for initial bring-up. This is now the most successful product in the Tandberg network infrastructure range.

#### Skills

The technical computing skills I gained from my PhD are highly relevant in this type of career. In particular, the knowledge and experience I acquired in general programming, systems administration, super-computing and inter-networking. My PhD also helped me to develop more generic skills such as time management, self-motivation and project planning which are valued in the private sector. During my time with the company I have hired two PhD physicists, who have both been a success.

Academic research is a rewarding career for those committed to it. Before completing your first post-doctoral position you need to assess whether you are committed to competing successfully for research funding in your own right and, if not, whether you will be happy either as a teaching academic or as a perennial post-doc. If the answer to this is no, then you should leave and take advantage of the many other career opportunities that exist for people like you outside academic research.

## Chris Littlewood, Investment Policy and Analysis Manager, Office of the Rail Regulator

### PhD: Particle Physics, University of Cambridge, 1997 to 2000



“Work on ways that you can demonstrate personal effectiveness either within your research group or in the wider community. For example, that you can plan and manage projects, meet deadlines, work as part of a team, communicate your ideas clearly (particularly to non-specialists) and organise your time efficiently.”

#### Career Path

I became a strategy consultant on completing my PhD, because I saw it as being based on problem solving, which is at the heart of my love for physics. I worked on diverse projects across a wide range of industries - for example developing a new sales strategy for a brewery in Malaysia, changing the focus of a website for a big telecoms firm, and recommending logistical changes in the supply of car parts in Germany.

After three years, I moved into a similar business strategy role in the UK public sector at the Strategic Rail Authority. My role involved using my strategic analysis skills to forecast rail industry finances and analyse train operators' business models.

#### What I do now

My current role is as an Investment Policy and Analysis Manager at the Office of the Rail Regulator. My job looks at how to set investment policy to produce a good outcome for rail users and taxpayers.

Recently, I also co-founded a company that helps individuals and companies to develop effective business spread sheeting skills. It provides online training in Microsoft Excel, tailored to individual knowledge and ability.

#### Skills

My experience is that a PhD which develops high-level mathematical, computational and quantitative skills is highly valued by a range of non-academic employers. Besides these skills, my PhD gave me experience of communicating complex technical information to non-specialists. This is perhaps the most important skill I developed through my PhD as it is fundamental to my job.

Most employers will take for granted that your PhD has given you quantitative analytical and research skills - but they might need some persuading that you can deploy them effectively in their business.

## Ewan O'Sullivan, Marie Curie Fellow, University Of Birmingham

### PhD: Astronomy, University of Birmingham, 1998 to 2002

“ Be flexible and recognise that the job market is international. Do not restrict yourself to looking for jobs only in the UK. Interesting work is being done worldwide, and living abroad is rewarding in itself. You will have the opportunity to take back your international experience to the UK at a later date should you wish. ”

#### Career Path

After my PhD, I took a postdoctoral fellowship at the Harvard-Smithsonian Center for Astrophysics in Cambridge, Massachusetts, working on X-ray observations of galaxies and groups of galaxies. The Chandra X-ray Observatory is largely operated from the Center for Astrophysics, so it is one of the main centres for X-ray astronomy worldwide. After three years as a post-doctoral research fellow, I had built up enough NASA funding to support myself in a full staff position for another four years, during which time I broadened the reach of my research to include some optical and radio work.

#### What I do now

I have now moved back to the UK, taking up a Marie-Curie Fellowship at the University of Birmingham to work on feedback processes in galaxy groups, using a combination of radio and X-ray data. I am still working closely with my collaborators in the USA, and I expect to travel out to the Giant Metrewave Radio Telescope in Pune, India, to work with colleagues there who are helping with the radio side of the project. The fellowship lasts for two years, after which I hope to move to a permanent (or at least long-term) position either at a UK university, or perhaps in the USA or Canada.

#### Skills

As I'm working as an astrophysicist full time, many of the skills I acquired through my PhD are still directly applicable to my job. Over time, the technical side of the job changes, with different observing capabilities and new analysis techniques becoming available. However, the underlying approach remains the same. The skills I gained in critical thinking, making presentations, communicating ideas clearly and working with or leading a team are all core skills that I continue to use in my job today.

As part of my PhD project I compiled a catalogue of X-ray luminosities of elliptical galaxies, which is still the largest and most complete available. This is very widely used and is probably my greatest contribution to the astronomical community to date. The project on which I am working currently has a great deal of potential for new discoveries and may help answer some of the most hotly debated subjects in extragalactic astronomy, such as the role of black holes in heating the hot, X-ray emitting gas halos of galaxy groups and clusters.



## Kim Page, Data Centre Scientist, University of Leicester

### PhD: X-ray Astronomy, University of Leicester, 2000 to 2003



“My advice to postgraduate students would be that, however much you may hate the thought of making presentations, this is a good way of helping the scientific community to get to know you.”

#### Career Path

After my PhD I continued working within the same department on short-term contracts covered by a number of grants. In August 2004, I started working for the NASA-led Gamma-Ray Burst (GRB) Explorer, Swift. Since then, I have been part of the UK Swift Science Data Centre (UKSSDC), which covers a number of areas.

#### What I do now

I keep the UKSSDC website up-to-date and run the e-mail help-desk. I act as a Burst Advocate and X-ray Burst Support scientist during Leicester’s duty weeks, responding to any GRBs we detect. I also help with the calibration of the X-ray Telescope and test new software. I have also been involved in various media presentations.

The BBC series *The Cosmos: A Beginner’s Guide* filmed an episode based round me and my job with Swift. Similarly, the London Science Museum currently shows a short video about my role as part of its *Cosmos & Culture* exhibition. I am also featured in a planetarium show (narrated by David Tennant!) called *We Are Astronomers*. Each of these experiences has been different and taught me more about promoting public understanding of science through the media industry.

#### Skills

Although my PhD was in Active Galactic Nuclei (AGN) rather than GRBs, the knowledge of X-ray astronomy I gained during my PhD is very useful. I use some of the same data analysis software (e.g. XSPEC) and continue to publish papers as I did during my PhD. I also got to know people within the AGN community who also work on GRBs, so contacts within the different groups can overlap. These networking skills will be useful whatever my future career path.

I very much dislike giving talks at conferences; though usually manage to overcome my abject terror when I have to! My advice to postgraduate students would be, however much you may hate the thought of making presentations (and many people do dislike talking to large audiences), this is a good way of helping the scientific community to get to know you. They may read your papers, but it helps if they can put a face to the name. Using opportunities to develop presentation skills, such as those I have had to work in scientific media, will also help your career development in other ways.

## Rachel Street, Post Doctoral Scholar, Las Cumbres Observatory, USA

### PhD: Astronomy, University of St. Andrews, 1998 to 2001

“Make sure you get sufficient recognition for your contributions in projects that have large teams. There are an increasing number of large, international, multi-institution projects these days. It is easy to get caught up in the work and not get enough first author papers.”

#### Career Path

My PhD research linked to the Wide Angle Search for Planets (WASP) consortium. Afterwards, I found a post-doctoral position with Queen's University Belfast, which was also involved with the WASP project. A year later I was awarded a PPARC Post-Doctoral Fellowship to continue my work on WASP. After this, I was successful in getting a position as a post-doctoral scholar with Las Cumbres Observatory in affiliation with University of California, Santa Barbara. I moved to the USA and worked at Las Cumbres Observatory since then.

#### What I do now

Las Cumbres Observatory is a private operating foundation, building a global network of telescopes for scientific research and research-based education. My position allows me to spend 100% of my time on research into exoplanets, using the observational facilities provided by the Observatory and contributing to the monitoring, quality control and calibration of the data coming from the telescope network.

My current position is a fixed term contract, and any future extensions will depend on my US visa status. I would like to continue working at Las Cumbres Observatory, but the recent drastic funding cuts to UK astronomy make remaining aboard particularly attractive at the moment.

#### Skills

The skills I acquired during my PhD are essential in my daily work, since I am active in the same field of research. I have gradually diversified my research and the skills I gained through my PhD have helped me to do this. Since I am primarily an observer, the experience I gained in conducting observations and in data reduction techniques during my PhD have been essential.

The importance of good programming skills is perhaps somewhat less obvious, but I have found the skills I developed in this area during my PhD to be invaluable. I have had to develop custom software for a variety of data handling and analysis, and these skills have come in particularly useful in an era where telescopes are becoming more robotic, and data volumes are increasing dramatically.

## Katherine Inskip, Post-doctoral Researcher, Max Planck Institut für Astronomie

PhD: Astrophysics, University of Cambridge, 1999 to 2002



“My move to Germany has shown me how easy and enjoyable it can be to work outside the UK. Language is not a barrier as English is the main language at work and there are great opportunities for astronomers.”

### Career Path

After my PhD, I was successful in getting a two year Lloyds' Tercentenary Foundation fellowship with the same research group. I then held a three year PPARC Post-Doctoral Research Fellowship at the University of Sheffield. Afterwards, I worked for a short period as a temporary lecturer before moving to Germany in 2008.

### What I do now

I currently have a four year PDRA-type post at the Max Planck Institut für Astronomie in Heidelberg. I have no teaching responsibilities, so can concentrate on building up my research record, which is essential to getting a permanent job in academic research. Similar positions are few and far between in the UK. It also gives me the opportunity to make further contacts in the international community, which is important in my area of research.

The Max Planck Institut für Astronomie has enabled me to work flexibly (I am currently working part-time but have also worked on a full-time basis). This has helped me to balance developing my career with having a young family.

In the future, I hope to find a permanent position in the UK but the current state of STFC and government finances means I do not feel too optimistic about this. If there are no suitable opportunities in the UK, I will move elsewhere in the world to find the right opportunity.

### Skills

I still work in more or less the same research field as my PhD, but have gradually moved from studies of powerful radio sources and their environments, towards the nature of Active Galactic Nuclei triggering, and the physical causes of the fundamental correlations between black hole and AGN host galaxy properties. I continue to use the key skills I developed through my PhD: analysing data (spectroscopic and imaging) and detailed programming knowledge. I work a lot on Integral Field Spectroscopy data, which is more complex than the long-slit spectroscopy I worked on in my PhD. I am now a lot more hands-on with my data - I write my own code as well as using packages. Effective communication of research results (both written and verbal) is an essential skill for an academic researcher, so presentation skills are vital.

Don't be afraid of moving, taking risks and working with new people. After my PhD I stayed with my research group and in hindsight, it would have been better for me to move on sooner, to broaden my research interests and expand my contacts in the academic community. In particular, do not be afraid to move outside the UK to find the right opportunities. Everything at work is in English and you will settle in quickly. It is easy to stay in your comfort zone but my advice would be to make the most of all the opportunities available to you.

## Peter Richardson, Reader, Department of Physics, Durham University

### PhD: Particle Physics, University of Oxford, 1997 to 2000



“If you are intent on a career in academic research, it is important that you work at good places with good people after your PhD. It is also important that you choose your area of research carefully. Try to think about how your research area is likely to develop in the future. What are going to be the important issues that will drive funding in the future? This will give you the greatest possible chance of securing a permanent position.”

#### Career Path

After my PhD, I accepted a two year postdoctoral research position in the Department of Applied Mathematics and Theoretical Physics and the Department of Physics at Cambridge University, where I continued my PhD research. I then secured a two year research fellowship in the Theory Division at CERN. This broadened my research interests into areas that are important to understanding the background to physics beyond the Standard Model at the Large Hadron Collider and the simulation of these processes.

Roughly at the time I completed my PhD, PPARC recognised there was a pressing need to strengthen and coordinate particle physics phenomenology research in the UK. PPARC decided to fund a dedicated Phenomenology Institute, large enough to serve fully the needs of the experimental community. After an open competition, it was decided to host the Institute at Durham University. This led to the creation of a number of new academic research posts over the next few years and I was fortunate to secure one of these mid way through my research fellowship at CERN.

#### What I do now

I joined the Institute for Particle Physics Phenomenology as a lecturer in 2004 and was promoted to reader in 2008. My job involves both undergraduate and postgraduate teaching and research in particle physics phenomenology.

#### Skills

I use the skills I developed during my PhD on a daily basis. I am now playing the lead role in the Herwig simulation project I became involved with as a PhD student, and so am using the skills I developed then in the most direct way possible. My teaching of both undergraduate, and particularly postgraduate, students involves passing on knowledge and skills I learnt as a student.

The next few years will be exciting times for particle physicists so make the most of your time as a research student and enjoy it. However, be aware that not everyone can continue in academic research and that there are many interesting and rewarding opportunities outside academic research. Many of my contemporaries and postgraduate students have moved into jobs where they are using their modelling and simulation skills in a different context, for example, in financial services and defence organisations. There are always good job opportunities for people with the type of high-level mathematical and modelling skills you develop through a Particle Physics PhD.