



COUNCIL FOR  
SCIENCE AND  
TECHNOLOGY

# Pathways to the future: the early career of researchers in the UK

A report by the Council  
for Science and Technology

October 2007

## **THE COUNCIL FOR SCIENCE AND TECHNOLOGY (CST) IS THE UK GOVERNMENT'S TOP-LEVEL ADVISORY BODY ON SCIENCE AND TECHNOLOGY POLICY ISSUES**

CST's remit is to advise the Prime Minister and the First Ministers of the devolved administrations on strategic issues that cut across the responsibilities of individual government departments. CST organises its work around five broad themes (research, science and society, education, science and Government, and technology innovation) and takes a medium to long term approach.

CST's past work profile includes reports on 'Nanoscience and Nanotechnologies: A Review of Government's Progress on its Policy Commitments', 'Health Impacts – A Strategy Across Government', A 'Better Use of Personal Information: Opportunities and Risks'; 'An Electricity Supply Strategy for the UK'; and 'Policy Through Dialogue: informing policies based on science and technology'. The Council has also provided advice to Government on improving interactions between academia and the services sector, and how procurement can drive innovation.

The members of the Council are respected senior figures drawn from across the field of science, engineering and technology. The current membership of the Council:

Professor Sir John Beringer CBE  
Professor Geoffrey Boulton OBE FRS FRSE  
Professor Peter Davies  
Professor Janet Finch CBE DL AcSS (co-chair)  
Professor Alan Gilbert  
Professor Wendy Hall CBE FREng  
Dr. Hermann Hauser FREng CBE CPhys FInstP  
Professor Alan Hughes  
Dr. Sue Ion OBE FREng  
Sir David King KB ScD FRS (co-chair)  
Sir Paul Nurse FRS FMedSci  
Sir Keith Peters FRS PMedSci  
Dr. Raj Rajagopal FREng CEng FIEE FIMechE FIE FCMI  
Dr. Philip Ruffles CBE  
Professor Michael Sterling FREng  
Professor Kathy Sykes CPhys FInstP  
Dr. Mark Walport FmedSci

### **Contact**

Council for Science and Technology  
Kingsgate House, 66-74 Victoria Street  
London SW1E 6SW

+44 (0)20 7215 2876  
cstinfo@dti.gov.uk  
www.cst.gov.uk

# Contents

<b>Executive Summary</b>	<b>2</b>
<b>Summary of conclusions and recommendations</b>	<b>4</b>
<b>1 Background</b>	<b>6</b>
1.1 Our evidence base	7
1.2 The work of others	7
<b>2 The research career framework</b>	<b>9</b>
2.1 Time for action	9
2.2 Specific issues	10
<b>3 Developing independence for researchers</b>	<b>11</b>
3.1 Concerns	11
3.2 Creating better career structures	12
3.3 Giving and rewarding greater levels of responsibility	13
3.4 Research fellowship awards	15
3.5 Researchers in the UK from overseas	16
<b>4 Valuing diversity in research</b>	<b>17</b>
4.1 Encouraging a multidisciplinary approach to research	17
4.2 Encouraging movement between sectors	18
<b>5 Training and development needs of researchers</b>	<b>20</b>
<b>Annex A – CST Young Researchers Workshop – Outcomes</b>	<b>21</b>
<b>Annex B – Work of others</b>	<b>27</b>

## Executive Summary

The excellence of the UK's science base is driven by the high quality of the people employed in university departments, research institutes and private and public sector laboratories. But this status is by no means guaranteed to last indefinitely. The UK must adapt to the growth of a globalised research base, where work can be undertaken across national boundaries; and to the emergence of new areas for exploration which occur at the boundaries of traditional disciplines, fostering economic growth and benefiting society. To maintain the UK's leading position over the next 20 years, researchers currently at the start of their careers must be effectively trained and managed to become world class leaders and scientists.

However, the current situation for researchers at the start of their careers is concerning. We have found high levels of dissatisfaction amongst post-doctoral staff. Some feel a lack of responsibility is entrusted to them, that there is a failure to see the relevance of their work in wider society and that they are being used by the system. Funders, with higher education and research institutes, need to act now to ensure a high quality workforce is in place to respond to future challenges.

Working in academia can be an attractive option that the most able undergraduates and graduates should consider. A research career is intellectually rewarding, allows creative thinking and can increasingly lead to profitable collaboration with business as ideas become products. It is also good preparation for a career in other sectors. Indeed, the pyramid structure that exists in academic research makes it inevitable that the majority of young researchers will leave academia for careers elsewhere. This should be seen as a positive step – such knowledge exchange brings benefits to the individual and wider economy, including business, education, public engagement and policy making.

A research career may not be able to compete with the salary of some jobs in the private sector, but in a competitive job market, we must ensure academia is seen to offer unique opportunities that will be attractive to a share of the best minds of each generation.

In spite of this, there is clearly a fragmentation of responsibility for ensuring that a career structure is in place which nurtures research staff. There needs to be a wholesale improvement of the management of early research careers. The upcoming revision of the Concordat and code of practice for career management of research staff in the HE sector is an ideal time to set out some changes which need to take place, formalise a careers framework, and detail its implementation.

We propose two key areas for reform:

First, **the development of a national framework for research careers** must be an essential part of the process. Much detailed work has been undertaken in recent years which should be brought together, and agreed by a partnership of funders, higher education and research institutions, and research staff at all levels. Not only must such a framework show how a career can progress in academia, but also how it prepares people for transitions to jobs in other sectors. The role of the Principal Investigator as an effective line manager has been much neglected and should be supported to a greater extent.

We urge funders, together with other bodies, to consider the incentives that could be put in place to encourage the uptake of a new system.

Secondly, **research staff must be allowed greater independence** at an earlier stage than at present, so they may take on greater responsibility for projects and staff. We believe that the use of research fellowships can play an important role and should be used more widely: personal 'ad hominem' fellowships allowing researchers greater freedom to move between institutions and fields; and institutional fellowships, whereby a researcher is attached to a department of a university and deployed within that unit rather than attached to a specific funded project.

We have also identified other specific issues that need attention to make a research post an attractive option for the best graduates and postgraduates, whether they intend to pursue a career in academia or not. We must encourage the building of global alliances, which would include exchanging research staff across national boundaries. For this to be realistic, however, new and returning researchers must be welcomed into a system which values and recognises their experiences in other arenas. Working across disciplines and sectors in the wider economy should similarly be encouraged, valued and rewarded.

A central issue in academia is how universities think of their research staff, in particular those at the start of their careers. As universities move to a new paradigm with contract research staff **there must be a change of mindset from HEIs: early career research staff should be properly treated as employees and given appropriate back-up for their staff development requirements.**

In this report we set out some of the issues that need to be tackled if the UK is to maintain a fully effective, highly skilled, research workforce to take the country through the next decades. We will be happy to work with RCUK and Universities UK as they develop the revised Concordat, to examine how the recommendations and conclusions we describe could be implemented

## Summary of conclusions and recommendations

1. A key issue in academia is how universities think of their research staff, in particular those at the start of their careers. As universities move to a new paradigm with contract research staff **there must be a change of mindset from HEIs: early career research staff should be properly treated as employees and given appropriate back-up for their staff development requirements.**

### The Research Career Framework

2. **We recommend that a partnership of HEIs, funders, and researchers move forward to develop an all-encompassing careers framework, which is focused on the researcher.** Funders, together with other bodies, should consider the incentives that could be put in place to encourage the uptake of a new system.
3. There already exists a variety of opportunities and sources of information for research staff, including schemes offering placement in industry, the media or the public sector and advice concerning career management. **We recommend that HEIs, in partnership with funders, ensure that there is greater consolidation, publicity and targeting of existing schemes and resources.**

### Developing independence for researchers

4. Research staff, especially early on in their careers, need more effective channels through which they can express their concerns, both locally to institutions, and nationally to funding bodies. **We recommend that RCUK, other funders and HEIs explore ways in which they can better recognise researchers' concerns;** for example, to support or establish local and national staff associations to fulfil this role.
5. We believe there needs to be progressive increase in responsibility and sense of being valued for those who stay in academia beyond a PhD. For example, giving an early career researcher opportunity to apply for even small sums of funding at an early stage gives them valuable experience and greater control over the research they are undertaking. **We recommend Research Councils, funding bodies and HEIs consider ways in which early career researchers may be allowed to apply for a greater range of grants.**
6. Post-doctoral researchers often supervise PhD students on a day-to-day, though a more senior member of staff may have the formal role. **We recommend funding bodies and HEIs consider allowing post-doctoral researchers an option to play a more formal, recognised, role in the training and mentoring of PhD students within research groups.** Appropriate training and assessment should be in place to ensure a high quality of supervision from staff of any level.
7. **We recommend funding bodies increase the number of fellowships awarded, consider extending the periods, and open a greater number to those who have just completed doctorates.** Fellowship programmes should be a priority for Research Councils when they allocate future increases in budgets.

Universities should also consider ways of employing researchers more in-line with the industry model so that through the pooling of research funding they are attached to groups or department rather than particular projects or grants. This is a natural development of the full-economic costing model and would free researchers from being tied to a particular grant for a set time. It would also strengthen the responsibility the institution has for the researcher. It could also bring benefits to multidisciplinary research. There would be practical challenges for institutions, given the fluctuations of grant funding, but we believe it is an idea worth pursuing by HEIs.

8. **Funders should explore ways of increasing the healthy flow of researchers between the UK and overseas (including outside the EU), in both directions.** It will be important to ensure that UK research careers remain sufficiently attractive to attract such researchers back at a later point in their career. **At the same time, Government should not inadvertently introduce new procedures which may discourage overseas researchers from coming to the UK.**

### Valuing diversity in research

9. **We recommend funders and HEIs assess the effectiveness of existing methods of exchange across sectors and disciplines, including transfers between academia, industry and the public sector; removing barriers where they are found to exist.**
10. **We recommend that Government, through the Technology Strategy Board, develops the Knowledge Transfer Partnership programme to support research staff to a greater extent.**

### Training and development needs of researchers

11. **At the outset of a research degree or post-doctoral position, a supervisor and researcher should establish training and development requirements as a primary component of a career framework,** whether the researcher's career lies in academia or elsewhere. They should consider whether experience in another sector, subject or country would be valuable. They should revisit these topics at intervals over the course of the researcher's contract.
12. **To allow Principal Investigators to play a full role in the development of their staff, HEIs must ensure that their research staff receive specific training and support to allow them to manage effectively.** This is already recognised in the QAA Code of Practice, but needs reinforcing. Co-supervising, mentoring and better use of existing management frameworks are examples of how this could be achieved. The reluctance of Principal Investigators to engage in formal management training must be overcome if early career researchers today are to make a contribution in years to come. Research staff should understand how better management could actually improve the quality of research being undertaken.

# 1 Background

International comparisons consistently show the UK's research base to be amongst the world's best – second only to the US as measured by citations, and leading the G7 in productivity<sup>1</sup>. It is crucial to maintain and enhance the excellence of this research base because of its increasingly important contribution to the vitality of society and the economy. A bedrock role of the universities in this enterprise has been to provide early research training for new graduates. Of these, some take up permanent academic posts to sustain the universities' dominant role in basic research; some move to specialist research institutes; some take up research posts in business and industry; some contribute to the development of relevant public policy; some take posts in teaching or the media, and all, whether employed as researchers or not, have the capacity to contribute to public utilisation of new knowledge in their roles as citizens.

In effect, this is a complex supply chain with the potential to deliver a wealth of capacity to a diverse series of important social roles. It must be managed in such a way that processes embedded in it are able to satisfy the dual demands of excellence and diversity. It has been too frequently assumed, not least by many young researchers, that the goal of research training is to produce academic researchers, and that other outcomes represent failure. The recent Leitch Review underlined the importance of PhDs and post-doctoral researchers as a critical resource – not only for academia but for the UK economy as a whole.<sup>2</sup>

This report is part of a larger study by the Council for Science and Technology of the health and vitality of the UK research endeavour and its readiness to face the challenges of the future. It concentrates on the early careers of young researchers, who provide the vital human capital for the research enterprise summarised above.

We have number of fundamental concerns, and suggest ways in which they might be addressed. We are concerned by the fact that 41 per cent of permanent university staff are aged over 50, and will need to be replaced by a new generation of talented researchers.<sup>3</sup> We are concerned by the limited perceptions of young researchers about possible career options.<sup>4</sup> It is clear that young researchers have great enthusiasm for their subjects and that they acquire great expertise during their research careers, but there are worryingly high levels of dissatisfaction when they cannot see a future for their skills or the relevance of their work to wider society. We are concerned that many are given inadequate responsibility at an early career stage and that their potential to act as independent researchers is under-utilised. We are concerned by the ad hoc nature of much early career support, the fact that many believe they are treated as "lab rats", and by the limited horizons of much early research training, which inhibits the capacity to address the new problems that increasingly occur at disciplinary boundaries. We are also concerned by the lack of policy about recruitment of international talent in an increasingly globalised research market.

There are however areas where there has been very welcome progress, such as in improved training and development opportunities for PhD students, and enhanced salaries for staff.

---

1 See Office of Science and Innovation analyses on 'Relative International Performance of the UK Research Base', at [http://www.dti.gov.uk/science/science-funding/budget/uk\\_research\\_base/page29207.html](http://www.dti.gov.uk/science/science-funding/budget/uk_research_base/page29207.html)

2 'Leitch Review of Skills' (December 2006), paragraphs 3.64 – 3.65, available at [www.hm-treasury.gov.uk/leitch](http://www.hm-treasury.gov.uk/leitch).

3 Research Councils UK 'Health of Disciplines: Annual report 2006', available at <http://www.rcuk.ac.uk/aboutrcuk/publications/corporate/hod.htm>.

4 We use the term 'early career researchers' to refer to postgraduate and postdoctoral researchers in the first ten years of their research careers, a definition used by the 'Rugby team' of the UK GRAD programme. Postdoctoral researchers (postdocs) include contract research staff and those with research fellowships.

Much needs to be done to realise the vision that Sir Gareth Roberts had for researchers in his report 'SET for success', and it is disturbing to find that many of the issues that he raised still need to be addressed.<sup>5</sup> The purpose of this report is to re-focus on these issues.

## 1.1 Our evidence base

To consider the future challenges to the UK's research endeavour, we initially convened a workshop with the help of the Henley Centre, attended by researchers, funders, business people and policy makers. The critical issues that came out of discussions fell into three groups, concerning the people ('who?'), the structure ('how?') and the research agenda ('what?').<sup>6</sup> This report focuses on the people, in particular the needs and requirements of researchers at the start of their career.

A mapping and analysis of published evidence and views of key stakeholders undertaken by Technopolis Ltd for CST suggested that an area of concern was the quality of science careers, in particular the scientist's level of control over their own career. It became clear to us that there was no organisation or body charged with taking a 20-30 year view of the impacts of current policy discussions on academic researchers, and that CST could take such a leading role.

To find out how researchers are being managed, and to hear from the people who will be facing the challenges of the future, we organised a 'young researchers workshop'. Twenty PhD students and early career post-doctoral researchers from a variety of disciplines (predominantly STEM subjects) and sectors (including university departments, research institutes, industrial labs and science policy) attended. A summary of this workshop is at Annex A.

Having some emerging conclusions, we sponsored a dinner-discussion with the Foundation for Science and Technology in February 2007, bringing together some of the key players in academia, public and private sectors with an interest in the management of researchers.

Together with other published studies and our own experiences of the research base, we have been able to form a clearer picture of what researchers experience early in their careers, and identify a set of actions that would ensure they are better valued and go on contributing to society.

This report represents our ongoing work on the 'people' aspect, concentrating on the start of a researcher's career, and taking a long term view.

## 1.2 The work of others

The work of Sir Gareth Roberts has, without doubt, been uniquely influential in this area, and we were deeply saddened to learn of his death in February 2007 as we prepared this report.

In Annex B we give a brief description of the major studies and reports we are aware of, and point to some of the bodies which are active. It appears work has been rather scattered, and it is disappointing to see a project such as that commissioned by HEFCE in 2003 ('to research and develop career management processes to Contract Researchers, and their managers,

---

<sup>5</sup> 'SET for success' (April 2002) available at <http://www.hm-treasury.gov.uk/roberts>.

<sup>6</sup> The report of the workshop, and analysis, is available on CST's website at [www.cst.gov.uk](http://www.cst.gov.uk).

in longer term career planning') appearing to have been left by the wayside.<sup>7</sup> We are encouraged by the developing 'Research Career Mapping Tool' which is designed to 'provide information regarding different research career paths, and ... aim [to] make career structures in research more visible to early-career researchers (eg at PhD and postdoctoral level).'<sup>8</sup>

The initiative has most recently been taken by RCUK with publication of a research careers and diversity strategy in January 2007.<sup>9</sup> There is much to commend in this document, and many of the recommendations in this report support their work. Together with the Research Career Mapping Tool, and revision of the concordat and code of practice for career management of research staff in the HE sector, it is an ideal time to bring everything together.

However, we believe that some elements of the process and content of an effective strategy need strengthening, and it those that we concentrate on in this report. We point to the bodies (or in some cases, groups of bodies) we believe could be responsible for taking the recommendations forward.<sup>10</sup> Existing organisations, such as UK GRAD, may be well placed to implement any changes.

7 A project led by the University of Sheffield in collaboration with the Universities of Manchester and Loughborough was directly funded with £240,000 from the HEFCE Good Management Practice Programme to fund and support initiatives to improve the career management and development of contract researchers. See <http://gmpcrs.group.shef.ac.uk/>.

8 Report available from <http://www.grad.ac.uk/downloads/documents/Reports/RCMT/RCMT%20Project%20Report%20March%202006.pdf>.

9 See <http://www.rcuk.ac.uk/rescareer/rcdu/careermanagement.htm>.

10 For convenience we have used 'funders' to refer to the higher education funding councils across the UK and Research Councils, and 'HEIs' to refer to both universities and research institutes.

## 2 The research career framework

### 2.1 Time for action

Research staff must be valued in a way comparable to other professionals at the start of their careers. New entrants to an organisation will routinely have a well thought out induction and development programme, to ensure they contribute to their maximum potential, and that the organisation retains their skills and experience. Researchers' commitment to, and love of, research is not an excuse to neglect the development of their careers.

It is clear that over the last 10– 15 years there has been increasing concern over how early career research staff are treated, and a commensurate amount of activity. However, this has often been fragmented and lacked sufficient levers to ensure actions were taken forward effectively – agreement of a process should go hand-in-hand with incentives to make it happen.

**We recommend that a partnership of HEIs, funders, and researchers move forward to develop an all-encompassing careers framework, which is focused on the researcher.** Other public and private sector organisations should also be involved to ensure that opportunities for career development will be available. Funders, together with other bodies, should consider the incentives that could be put in place to encourage the uptake of a new system.<sup>11</sup>

The framework should start from the graduate level and continue through potential careers paths of a researcher, covering:

- Information on careers – in particular the range of options available and their requirements;
- Levels of responsibility that may be delegated at each stage;
- Opportunities for relevant training, and development;
- The value of transitions to and from other disciplines, HEIs, sectors and countries, either as career changes or placements/internships; and
- Recognition, and documentation which researchers can use as evidence of their skills, experience and achievements.

Much work has been done on the detail of various aspects, including projects funded by HEFCE and the Research Careers Committee (see Annex B). This needs to be joined-up.

There already exists a variety of opportunities and sources of information for research staff, including schemes offering placement in industry, the media or the public sector and advice concerning career management. **We recommend that HEIs, in partnership with funders, ensure that there is greater consolidation, publicity and targeting of existing schemes and resources.**

Key to success is for research staff to be seen as professionals by HEIs, funders, PIs and themselves, and for each of these groups to take responsibility for developing research staff. There should be requirements to train research staff at all levels to ensure they have the appropriate skills, particularly at the level of PI, whose role as the effective line manager has

---

<sup>11</sup> We note, with interest, how EPSRC and BBSRC will take the career development of postdoctoral researchers into account when evaluating research proposals ('Postdoc career development to be considered in EPSRC and BBSRC grant reviews', Research Fortnight News, 20 June 2007).

often been neglected. In turn, researchers should be encouraged to engage with their employers, and acknowledge a responsibility for their own careers through training and development opportunities.

## 2.2 Specific issues

Our own work has found several specific issues that need attention as part of the framework, to ensure the UK gets the most out of this group of highly skilled people, in academia, business and wider society:

- **Developing independence for researchers in HEIs and research institutes**  
To make a research career an attractive option to the best graduates the levels of responsibility for researchers should be progressively increased to allow greater research independence; and a greater emphasis placed on individual, *ad hominem*, research fellowship awards.
- **Valuing of diversity in research**  
Researchers should be given more opportunities to cross traditional discipline boundaries to stimulate new inter- and multi-disciplinary fields; and to take part in exchanges with other sectors to benefit themselves and the economy as a whole.
- **Further improvements in training and development**  
Great strides have been made in training and developing PhD students, for example the GRADschools programme; the same commitment must be given to postdocs.

Recommendations in each of the following chapters address these individual factors which, within a careers framework, we believe could give the UK a better motivated, higher and appropriately skilled research workforce in universities, business and elsewhere.

## 3 Developing independence for researchers

The UK has some of the best universities in the world, and Government has made huge investments in science over the last nine years.<sup>12,13</sup> This combination means that the UK is a very attractive place to pursue research and an academic career, which we must capitalise on. There is a risk, however, that over the next 20 years, the strength of the UK science base could be threatened – a report we commissioned found deep-seated concern that there could be a ‘tipping point’ as other sectors, and countries, employ the most able graduates and postgraduates.<sup>14</sup>

If we are to maintain the strength of the university research base we must encourage the best students, at an early point in their education, to consider jobs in academia both as a career option, and stepping stone to other sectors. We need researchers who will go on to lead world class research teams, and those who will be the lab ‘lieutenants’ delivering excellent research. Both sets need proper career management, and in this chapter we consider ways to improve research posts, predominantly in HEIs.

Some changes to career structures are needed, and the profound intellectual satisfaction gained must be emphasised. There is currently no sense that an academic career competes in a marketplace for talented individuals, as for example, the financial sector does.<sup>15</sup> Pay is just one factor that affects careers choices (which we do not address in this report), higher education should be promoting itself on all fronts. A career as a researcher should offer, and be seen to offer, good long-term prospects for the most able, with a transition from a training PhD to an independent researcher being a seamless natural progression.

Research Councils are the single biggest employers of post-doctoral researchers and funders of PhD students. They are agents for change across the whole sector, with an important leadership role when it comes to setting standards. We are pleased to note that in their research careers strategy, RCUK is committed to making career paths more visible to early-career researchers.

### 3.1 Concerns

Whilst recruitment is currently not a problem except in some specific areas, a wider concern for many in higher education is that of quality.<sup>16</sup> We believe that a combination of better defined careers structures, specific measures giving early career researchers progressively more responsibility, and greater emphasis on research fellowship awards by funders will go some way to addressing these matters. Some funders and HEIs have recognised and improved matters – we note elements of good practice in this report, and encourage others to learn from their experience.

---

12 The Times Higher Education Supplement world university rankings, available from <http://www.thes.co.uk/worldrankings/>.

13 Between 1997 and 2007 the science budget will have more than doubled, rising to £3.4 billion. See <http://www.dti.gov.uk/science/science-funding/budget/page28923.html> for details of the science budget.

14 ref Technopolis report

15 Graduate careers fairs may only have a handful of institutes recruiting to postgraduate research programmes, see e.g. the London Graduate Recruitment Fair Summer 2007 exhibitor list at <http://www.londongradfair.co.uk/summer/exhibitorlist.aspx>.

16 Ref Technopolis report and others

Our workshop for early career researchers bore out what other surveys have shown, namely that there is dissatisfaction among post-doctoral researchers with a lack of career prospects and a sense of being undervalued.<sup>17,18</sup> Whilst recent EU regulations may go some way to addressing the insecurity of short term contracts, the image of the 'eternal postdoc', with years of experience, but stuck at a relatively junior level still exists.

We are concerned that the feelings of dissatisfaction with scientific careers are filtering into the wider science base and possibly into the education system as a whole. Post-doctoral researchers are often the first point of contact for PhD students and undergraduates following project-based courses. Even schools may feel the effects, as children assess the attractiveness of future careers from advisors and others when choosing which 'A' level options and degree courses to follow.<sup>19</sup> People working at the frontiers of discovery are ambassadors for science whatever their eventual careers.

The Research Assessment Exercise has over the years placed an emphasis on publications. Research output is the primary task of a researcher and we agree that publications are rightly a core metric, but it should not be seen as the sole measure for assessing and developing our university researchers. We have addressed reform of the RAE separately in advice to Government, and return to this point in section 4.2. An impact of the current system, however, is that a number of postdocs we met described being treated as 'lab rats' – with a pressure to publish papers at the expense of nurturing and developing wider skills.

Research staff, especially early on in their careers, need more effective channels through which they can express their concerns, both locally to institutions, and nationally to funding bodies. **We recommend that RCUK, other funders and HEIs explore ways in which they can better recognise researchers' concerns;** for example, to support or establish local and national staff associations to fulfil this role.<sup>20</sup>

### 3.2 Creating better career structures

The career of an academic researcher, especially in the future, is likely to span institutions, departments and research funders. In the case of early career researchers,<sup>21</sup> they often have the HEI as their employer which has overall responsibility for professional development issues. Research councils have set aside 'Roberts' funding for HEIs to cover training and career development of postgraduate and post-doctoral researchers. However, the level of interest HEIs have in contract research staff may be quite variable as they are generally funded through a specific project grant, and may be employed for a limited time (70% of research staff have been in their current institution for less than five years).<sup>22</sup> Concordats and Codes of Practice do put an onus on HEIs, but in practice they have limited visibility.

17 'Recruitment and Retention of Academic Staff in Higher Education' (July 2005) a report from the National Institute of Economic and Social Research, available at <http://www.niesr.ac.uk/pubs/searchdetail.php?PublicationID=645> describes (p 207): "Academic jobs tend not to meet research students' (and probably potential career changers') aspirations for career progression and this was one of the main disincentives to an academic career. Amongst academic staff, dissatisfaction with career prospects was high, although this did not appear to affect retention in the sector."

18 'Impact of the Roberts' Review Enhanced Stipends and Salaries for Researchers' (February 2006) a report by the Centre for the Study of Law and Policy in Europe, available at <http://www.rcuk.ac.uk/aboutrcuk/publications/policy/enhanced.htm>. Annex 7 "How Attractive are Research Careers in UK Higher Education?".

19 'Science teaching in Schools' House of Lords Select Committee on Science and Technology (November 2006) available at [http://www.parliament.uk/parliamentary\\_committees/lords\\_s\\_t\\_select/teaching.cfm](http://www.parliament.uk/parliamentary_committees/lords_s_t_select/teaching.cfm).

20 The National Research Staff Association is a new organisation being set up to give postdocs a national voice, see <http://scratchpad.wikia.com/wiki/NationalpostdocUK>.

21 See RCUK's guidance on 'Career Development and Skills Training for Research Students and Researchers' at <http://www.rcuk.ac.uk/rescareer/rcdu/training.htm>.

22 Also see comments from the 'Rugby team' in section 5, that "few HEIs currently have cohesive training and development systems", footnote 30.

A key issue in academia is how universities think of their research staff, in particular those at the start of their careers. As universities move to a new paradigm with contract research staff **there must be a change of mindset from HEIs: early career research staff should be properly treated as employees and given appropriate back-up for their staff development requirements.**

The development of a 'Research Career Mapping Tool' by the Research Councils in collaboration with the Royal Society and Wellcome Trust, and plans for a revised concordat and code of practice for career management of research staff in the HE sector are steps in the right direction, and must be driven forward<sup>23,24</sup>, Ensuring these reach the target groups and are effective in achieving their aims will be key to making a real difference to early career researchers – briefing on these schemes should be part of a short induction to postdoctoral work. As recognised in RCUK's research careers strategy, ongoing evaluation of these new initiatives, alongside longitudinal studies tracking researchers, must be an integral part of the projects.

However, we are concerned that without real incentives, proposed schemes will not be adopted. To reiterate from section 2.1:

**We recommend that a partnership of HEIs, funders, and researchers move forward to develop an all-encompassing careers framework, which is focused on the researcher.** Funders, together with other bodies, should consider the incentives that could be put in place to encourage the uptake of a new system.

### 3.3 Giving and rewarding greater levels of responsibility

Whilst post-doctoral researchers may be preparing grant proposals and supervising research students, quite often this goes unrecognised leading to a feeling of being undervalued. Allowing researchers to take on responsibility earlier in their careers, and giving due recognition, would give them more control over their work, and be useful experience that could be demonstrated to future employers, not just in academia. We propose tackling this in a number of ways – by giving postdocs more opportunities to apply for grants; awarding more individual fellowships; and recognising the greater supervisory roles that postdocs undertake.

Opportunities for early career researchers to apply for grants do exist. However, this is not universal and there is a lack of consistency (see box).

We believe there needs to be progressive increase in responsibility and sense of being valued for those who stay in academia beyond a PhD. For example, giving an early career researcher opportunity to apply for even small sums of funding at an early stage gives them valuable experience and greater control over the research they are undertaking. **We recommend funding bodies and HEIs consider ways in which early career researchers may be allowed to apply for a greater range of grants.**

Post-doctoral researchers often supervise PhD students on a day-to-day, though a more senior member of staff may have the formal role. **We recommend funding bodies and HEIs consider allowing postdocs an option to play a more formal, recognised, role in the training and mentoring of PhD students within research groups.** Appropriate training and assessment should be in place to ensure a high quality of supervision from staff of any level.

23 Scoping and user specification for the Research Career Mapping Tool available at <http://www.grad.ac.uk/downloads/documents/Reports/RCMT/RCMT%20Project%20Report%20March%2006.pdf>.

24 Note on a revised concordat and code of practice for career management of research staff in the HE sector available at <http://www.rcuk.ac.uk/rescareer/rcdu/careermanagement.htm>.

**Box: Examples of conditions set by funding bodies for grant applications.**

**BBSRC:** At the time of application applicants must be resident in the UK and hold an appointment which extends beyond the period of the proposed research grant at either an eligible HEI or RCI at lecturer level or equivalent and above.  
[http://www.bbsrc.ac.uk/funding/research/grants\\_booklet.pdf](http://www.bbsrc.ac.uk/funding/research/grants_booklet.pdf)

**EPSRC:** To apply for the 'first grants scheme' which is designed to help new academics apply for research funding at the start of their careers, requires applicants to have been appointed to an academic lecturing appointment in a UK university.  
<http://www.epsrc.ac.uk/ResearchFunding/Opportunities/NewAcademics/FirstGrant/Eligibility.htm>

For general research grants, fixed term employees may be eligible provided EPSRC is satisfied the host institution is prepared to support the applicant as for a permanent employee, although Research Assistants cannot be Principal Investigators.  
<http://www.epsrc.ac.uk/CMSWeb/Downloads/Publications/Other/FundingGuide2005V2.pdf>

**ESRC:** Applicants are eligible for funding whether or not they are established members of a recognised RO.  
[http://www.esrcsocietytoday.ac.uk/ESRCInfoCentre/Images/Research\\_Funding\\_Guide\\_2005-Mar07\\_tcm6-9734.pdf](http://www.esrcsocietytoday.ac.uk/ESRCInfoCentre/Images/Research_Funding_Guide_2005-Mar07_tcm6-9734.pdf)

**MRC:** Researchers supported on open-ended or fixed-term contracts may apply for grants, and may request funds for their own salary. The Research Councils' conditions of grant awards do not include a requirement to appoint staff on a fixed-term basis. This is a matter for the employer to determine and is not related to eligibility for funding.  
<http://www.mrc.ac.uk/Utilities/Documentrecord/index.htm?d=MRC001873>

**PPARC:** Post doctoral research assistants at spine point 15 or above on the RA2A academic and related pay scales, or equivalent, can now be named as Principal Investigators or Co-Investigators. Research assistants in this category must ensure that their appointment extends for at least the period of the grant for which they are seeking funds and that their status is endorsed by the Head of Department.  
<http://www.pparc.ac.uk/rs/rgh/rghDisplay2.aspx?m=s&s=8>

**Wellcome Trust:** Principal applicants must be established researchers who are expected to apply from an eligible institution, able to sign up to the Wellcome Trust's Grant Conditions and, should normally: hold an academic or research post (or equivalent); be in receipt of a salary for the duration of the grant; have at least five years' postdoctoral (or equivalent)  
[http://www.wellcome.ac.uk/doc\\_WTD004250.html](http://www.wellcome.ac.uk/doc_WTD004250.html)

### 3.4 Research fellowship awards

In the early stages of a career in research, employment is normally either on the basis of a research grant obtained for a specific project or through a fellowship awarded *ad hominem*, to an individual.

Individual fellowships, of the type supported by the Royal Society, Royal Academy of Engineering, Research Councils and Wellcome Trust, give greater freedom and responsibility to researchers. According to the conditions of an award, the funding may follow the person, putting an obligation on institutions and research units to retain their best people. These fellowships also allow researchers to apply for funding for their work, giving independence and control over what they do.

RCUK's Academic Fellowship scheme, developed in response to the Roberts Review, are an excellent way of providing contract research staff with more attractive and stable paths into academia.<sup>25</sup> We encourage evaluation of the scheme as it progresses, with a view to increasing the numbers supported if it proves to have been successful in nurturing talent and carrying out excellent research.

We believe that further increasing the number and scope of fellowships would make a research career a more attractive career option for graduates and postgraduates. The number of fellowships awarded by research councils is in the tens, with success rates frequently less than 20%.<sup>26</sup> Such low numbers may mean that high quality researchers are being missed or put off from applying. In addition the duration of some fellowships is just three years which we do not believe is long enough to "enable talented new researchers to establish an independent research career".<sup>27</sup> Five years should be a minimum, and we believe there would be merit in allowing longer periods for exceptional researchers who prove their ability.

**We recommend funding bodies increase the number of fellowships awarded, consider extending the periods, and open a greater number to those who have just completed doctorates.** Fellowship programmes should be a priority for Research Councils when they allocate future increases in budgets.

Universities should also consider novel ways of employing researchers. One model might be for institutions or departments to pool project funds to employ a core body of research staff, so that they become a resource of a department or group. This would free researchers from being tied to a particular grant for a set time, and strengthen the responsibility the institution has for the researcher. It could also bring benefits to multidisciplinary research. There would be practical challenges for institutions, given the fluctuations of grant funding, but we believe it is an idea worth pursuing by HEIs.

---

25 Details at <http://www.rcuk.ac.uk/acfellow/default.htm>.

26 For example, MRC Fellowship Application Success Rates at <http://www.mrc.ac.uk/Careers/Fellowships/FellowshipApplicationSuccessRates/index.htm>, and STFC success rates of applicants to the Postdoctoral and Advanced Fellowship schemes at <http://www.scitech.ac.uk/Grants/Fells/SciTech/SuccessRates.aspx>. Information on fellowships, including success rates compiled at [http://sciencecareers.sciencemag.org/career\\_development/previous\\_issues/articles/3500/funding\\_for\\_independence\\_find\\_a\\_fellowship](http://sciencecareers.sciencemag.org/career_development/previous_issues/articles/3500/funding_for_independence_find_a_fellowship).

27 EPSRC information on postdoctoral fellowship, from <http://www.epsrc.ac.uk/ResearchFunding/Opportunities/Fellowships/PostdoctoralFellowships.htm>.

### 3.5 Researchers in the UK from overseas

With our highly successful research base (and language), the UK HE sector finds it easy to attract staff from overseas. Indeed, the proportion of non-UK nationals in the core academic staff has grown from 8 per cent in 1995/96 to 14 per cent today.<sup>28</sup> About one-third of these come from Western Europe, and just under a fifth from Australia, USA, Canada or New Zealand.

There are arguments that it may be dangerous for the university sector to rely too heavily on recruiting from overseas, as shifts in the global market for HE staff may leave the UK vulnerable. However, the international links that are fostered by such exchanges can bring enormous benefit. As such, the UK should ensure it remains an attractive place for people to come and carry out research. At the same time, the links that are built from either UK or non-UK nationals going abroad must not be allowed to crumble.

We believe in addition that the UK must continue to develop an indigenous cadre of researchers, so some careful analysis will be required such that the UK's research capacity is increased in line with requirements, but an internal pipeline for research staff is not hindered.

**Funders should explore ways of increasing the healthy flow of researchers between the UK and overseas (including outside the EU), in both directions.** It will be important to ensure that UK research careers remain sufficiently attractive to attract such researchers back at a later point in their career. **At the same time, Government should not inadvertently introduce new procedures which may discourage overseas researchers from coming to the UK.**

---

<sup>28</sup> 'The higher education workforce in England: A framework for the future' (July 2006), available at [http://www.hefce.ac.uk/Pubs/hefce/2006/06\\_21/](http://www.hefce.ac.uk/Pubs/hefce/2006/06_21/).

## 4 Valuing diversity in research

Breakthroughs in science and their exploitation will come from greater diversity across traditional disciplines and sectors<sup>29</sup>. The academic community must adapt, and funding mechanisms must drive this change, at a pace that keeps the UK as a leader in the international research endeavour. We have examples of how the work of scientists has been restricted with strong disciplinary silos, and will be undertaking some work specifically looking at how barriers can be broken down.

Researchers now at the beginning of their careers must be equipped to deal with the new paradigm, and given opportunities to work in other disciplines and sectors. This applies both to those who will pursue a career in wider society, and those who will stay in academia.

Measures to promote the flow of people across sectors and disciplines should help with a series of issues:

- Enable better knowledge exchange, and making boundaries more ‘permeable’ (‘Knowledge transfer doesn’t happen without people transfer’)
- expand the skills of researchers
- help expand researchers understanding of different sectors and how to work with (or in) them
- help researchers understand what skills they offer
- help other sectors recognise and value the skills of those working in the research base, and use them better

### 4.1 Encouraging a multidisciplinary approach to research

Over the next twenty to thirty years, exciting advances in science which bring benefit to society are likely to happen at the boundaries of and across traditional disciplines. However, there are barriers to working across disciplines and there is little training to help prepare researchers to do it well.

Research Councils are making efforts to help grant applications which cross disciplinary boundaries. But we feel that so long as researchers are based in discipline-based departments, applying to discipline-based funding agencies and are assessed by discipline-based panels, specific incentives to encourage multidisciplinary working will be needed.

Our future work will examine multidisciplinary working in greater detail, but at this stage we believe that research students and post-doctoral researchers should be encouraged to work across departmental and university boundaries where it may benefit their research, or that of others. It is clear to us that identifying the links between the natural and social sciences, in particular, will become a more important part of applied scientific research.

---

<sup>29</sup> Ref Technopolis report

## 4.2 Encouraging movement between sectors

The movement of scientists into industry benefits the economy, and their skills are valuable in education, policy making, and the media.<sup>30,31</sup> But researchers at the start of their careers often find it difficult to see the relevance of their work and value of their skills and experience to those outside of academia. People who do leave academia and enter other sectors can often be seen as ‘failures’ (by themselves or others).<sup>32,33</sup> By properly valuing a wide range of experiences, researchers and wider society will benefit.

Researchers should be encouraged to cross between sectors (the business world, policy-making, media, teaching in schools) at all stages, in ways that are valued, e.g. through sandwich courses, PhD placements, internships, secondments, transitional grants. Experiences of working outside of an HEI or research institute need to be more available; and if researchers shape and drive the directions they move in, their learning experiences should be more powerful. Researchers crossing back to universities have the potential for better focusing research in universities on problems that will directly benefit the economy or society.

Several schemes do exist, particularly at the PhD level, with about one-third of doctorate students funded collaboratively with industry. For those who have started on a research career path, the options are more limited. The Royal Society administers an Industry Fellowships scheme, but this funds just a dozen or so people a year. ESRC has also introduced a placement scheme whereby researchers will spend time in a Government department, a concept being taken-up by the Environment Research Funders Forum.<sup>34</sup>

**We recommend funding bodies and HEIs assess the effectiveness of existing methods of exchange across sectors and disciplines, including transfers between academia, industry and the public sector; removing barriers where they are found to exist.**

Some methods that could be explored include:

- Research Councils extending the use of transitional grants, which allow researchers to ‘buy time’ as they cross disciplinary boundaries.<sup>35</sup>
- HEIs and funders making components from a wider range of subjects more easily available as part of postgraduate training.
- Research Councils extending the use of programmes that allow early career researchers to spend time in business, industry, the media or the public sector. This does not need to be specifically funded by Research Councils, but facilitated and encouraged.

Given the potential benefits to UK plc, Government should also consider enabling a greater exchange of skills between academia and industry. The Knowledge Transfer Partnerships (KTP) scheme, which promotes and supports the exchange of skilled people from academic

30 “The benefits from publicly funded research” (September 2006) B. Martin and P. Tang, SPRU

31 “Scientific Advice, Risk and Evidence Based Policy Making” (November 2006) House of Commons Select Committee on Science and Technology available at <http://www.publications.parliament.uk/pa/cm200506/cmselect/cmsselect/900/90002.htm>.

32 CST’s ‘Young Researchers’ workshop, report at Annex A.

33 ‘Recruiting PhDs: What works?’ (March 2007) Charles Jackson for UKGRAD, available at <http://www.grad.ac.uk/downloads/documents/Reports/2007%20publications/Recruiting%20PhDs%20what%20works%20March%202007.pdf>: “Researchers felt ‘they would be perceived as disloyal or uncommitted for wanting to leave academia” (p. 4).

34 “Using Research to Inform Policy: the Role of Interpretation” (March 2007) R. Clark for Environment Research Funders’ Forum available at <http://www.erff.org.uk/reports/reports/reportdocs/interpretstudy070326.pdf>.

35 E.g. MRC awarded 18 discipline hopping grants (<http://www.mrc.ac.uk/ApplyingforaGrant/AvailableGrants/DisciplineHoppingGrant/index.htm>) and 4 Institutional Discipline Bridging Awards (<http://www.mrc.ac.uk/ApplyingforaGrant/AvailableGrants/InstitutionalDisciplineBridgingAward/index.htm>)

institutes to industry, has been successful at helping businesses to improve their competitiveness and productivity through the better use of knowledge, technology and skills that reside within the UK knowledge base. However, there is limited opportunity for research staff to take advantage of this mechanism, and employers have reported difficulties finding people in this category.<sup>36</sup>

**We recommend that Government, through the Technology Strategy Board, develops the Knowledge Transfer Partnership programme to support research staff to a greater extent.**

Future systems for allocating research funds should further value research outcomes such as working with industry, publishing articles aimed at a wider audience, or feeding into development of government policy. How changes may influence behaviour must be carefully considered to avoid unintended consequences, in particular on early career researchers. We have provided separate advice to Government on these points.<sup>37</sup> We recognise that the 2008 RAE will look wider than output in peer reviewed journals, and look forward to an evaluation of this. We are also pleased to note that RCUK fellowships come with an obligation to undertake outreach activities. With the RAE in the process of being revised, it is a further opportunity to embed the acceptance of other research outputs at the highest level.

---

36 'Recruiting PhDs: What works?' (March 2007) Charles Jackson for UKGRAD, available at <http://www.grad.ac.uk/downloads/documents/Reports/2007%20publications/Recruiting%20PhDs%20what%20works%20March%202007.pdf>: "The employers interviewed for this project fell into two groups: those who seek PhD graduates for their subject specific knowledge and skill (eg the Pharmaceutical Industry, Research and Development companies), and those who seek to find graduates with the advanced generic skills obtained by the process of achieving a PhD (eg Investment Banks, Management Consultants). Both of these groups find PhD researchers highly employable, but complained that they were not reaching as many researchers as they would like." (p. 5).

37 CST response to consultation on 'Reform of higher education research assessment and funding' (October 2006), available at <http://www.cst.gov.uk/cst/business/files/rae-response.doc>.

## 5 Training and development needs of researchers

We are pleased with the excellent training opportunities for PhD students which now exist, following the recommendations from 'SET for success'. Generic skills training (CRAC courses) are rated extremely highly by those who attend.

The existing QAA Code of Practice for postgraduate researchers states that "development needs will be identified and agreed jointly by the student and appropriate academic staff".<sup>38</sup> The position for postdocs is less easy to assess. Sir Gareth Roberts recommended at least two weeks training each year. Though HEIs are provided with funding for such training and are responsible for the professional development of their staff, there is little available information as to the outcomes. The 'Rugby team', which has begun the process of evaluation, has noted "few HEIs currently have cohesive training and development systems".<sup>39</sup>

**At the outset of a research degree or postdoctoral position, a supervisor and researcher should establish training and development requirements as a primary component of the career framework,** whether the researcher's career lies in academia or elsewhere. They should consider whether experience in another sector, subject or country would be valuable. They should revisit these topics at intervals over the course of the researcher's contract.

**To allow Principal Investigators to play a full role in the development of their staff, HEIs must ensure that their research staff receive specific training and support to allow them to manage effectively.** This is already recognised in the QAA Code of Practice, but needs reinforcing. Co-supervising, mentoring and better use of existing management frameworks are examples of how this could be achieved. The reluctance of Principal Investigators to engage in formal management training must be overcome if early career researchers today are to make a contribution in years to come. Research staff should understand how better management could actually improve the quality of research being undertaken.

RCUK's "Health of Disciplines: Annual Report 2006" found that employers are of the view that many PhD holders lack certain business critical skills".<sup>40</sup> Funding bodies and HEIs should recognise the fact that only a small proportion of early career researchers will find permanent academic posts; both should have an obligation to prepare employees for the future.

We are pleased to see RCUK's research careers strategy making this a priority for future action, and will follow developments.

---

38 QAA 'Code of practice for the assurance of academic quality and standards in higher education' available at <http://www.qaa.ac.uk/academicinfrastructure/codeOfPractice/section1/default.asp#precepts>.

39 "Evaluation of skills development of early career researchers" (February 2006) available at <http://www.grad.ac.uk/downloads/documents/Reports/Rugby%20Team/Rugby%20Team%20strategy%20report%20Mar%202006.pdf>.

40 Research Councils UK 'Health of Disciplines: Annual report 2006', available at <http://www.rcuk.ac.uk/aboutrcuk/publications/corporate/hod.htm>.

# Annex A – CST Young Researchers Workshop – Outcomes

## The UK's 'Research Endeavour'

The Council for Science and Technology, through its 'Research Endeavour' subgroup, is considering the challenges that the UK will face in maintaining an excellent research base. The UK needs to ensure that the science base continues to have access to, and is able to develop, a pool of bright, creative people whose capabilities meet business and society's needs; and that the university research base is sustainable over the next 20 years. Further, the challenge is to translate the Government's investment in the science base into wealth creation by UK companies, and obtain best value in terms of research output. There are two main components – the *people*, and the *structures*.

Focusing on one aspect of the *people*, the 'Research Endeavour' subgroup organised a workshop on 14 June to explore how the UK manages its young researchers. Twenty such 'young researchers' (including PhD students, postdocs and those who had recently left research) attended from a variety of disciplines (predominantly STEM subjects) and institutions (including university departments, research institutes, industrial labs and science policy). Four subgroup members took part, and officials from Research Councils UK, the Wellcome Trust and the Royal Society were present. A list of attendees is at Appendix.

Starting from the premises that

- (i) over the next 20 years there will be challenges to the UK's research endeavour, with possible changes to the way the research base is structured and funded, and that
- (ii) the UK needs a highly skilled research base, in academe and the private sector, where
- (iii) the exchange of researchers between sectors is valuable; and that
- (iv) young researchers need adequate training to prepare them for their careers, in whichever sector;

the workshop took on three broad objectives:

1. To identify elements of PhD and postdoc training that would be valuable for a career in academe, business, industry or Government.
2. To ascertain whether career pathways of young researchers are sufficiently flexible to allow mobility between sectors (academe, business, industry, public sector/government) and countries, and what could be done to improve flexibility.
3. To understand how changes to funding arrangements and research base structures may affect young researchers.

The workshop began with an opportunity to hear from participants in the morning, and moved on to group work based on the objectives in the afternoon.

---

<sup>41</sup> We include the social sciences within the scope of our work, though unfortunately did not have social scientists participate in the workshop.

## Morning session

The morning session opened with presentations from representatives from the fledgling National Postdoctoral/Contract Research Staff Association, the National Postgraduate Committee, and RCUK. Following this, a *tour de table* gave participants a chance to give their experiences of the training they had received, mobility between sectors and the effect of their research environment on their careers.

John Bothwell, a “reasonably average postdoc” from the Marine Biological Association in Plymouth, had asked himself the question, “what has a postdoc prepared me for?”, and found that he didn’t know the answer. He had found no equivalent to the US National Postdoctoral Association, and set about setting up a UK National Research Staff Association. A Nature article<sup>42</sup> on the case for one had led to much interest, and an inaugural meeting had been organised for 22 June. He felt that whilst the research community wanted postdocs to carry out research, communicate their results and provide a skills base for the science base, research staff got very little out of postdoc-ing – a sense of purpose was lacking. Postdocs do a lot in terms of giving talks, teaching, writing etc., but it is just the number of published papers that counts.

Simon Felton, described the role of the National Postgraduate Committee, and some of the issues postgraduate researchers were concerned about. He felt that businesses did not recognise the higher levels of skills and experience that PhD students had, which limited mobility between the sectors. There were also problems with paying National Insurance contributions whilst studying for a PhD, the concentration of research in fewer universities preventing opportunities for research, and when poor supervision affected completion of a PhD.

Iain Cameron, Head of Research Careers and Diversity in RCUK, explained how Research Councils were striving to improve the career development of the young researchers they funded (about 1/3 of full time researchers in the UK). The 2002 Roberts Report ‘SET for Success’ set out a vision for postdoctoral researchers and was having an impact, including setting minimum standards for research degrees, and offering new career routes through academic fellowships. However, it was recognised that there was much still to do to achieve the vision. He pointed out that from 10 July, universities would have to change the way they managed researchers because of new European regulations.

Some common points that came from the *tour de table* included:

- The GRADschools were very useful, and attendance should be actively encouraged for all PhD students.<sup>43</sup>
- Mobility between academe and business was perceived to be limited.
- Businesses and other organisations offered much superior training for their young researchers, compared to universities.
- Emphasis was placed on producing peer-reviewed publications for the RAE above all else.
- Self-motivation was an important aspect of being a researcher, this should encompass thinking about one’s career.

---

42 *Nature* **441**, 546 (May 2006)

43 <http://www.gradschools.ac.uk/>

## Afternoon session

In the afternoon small groups considered each of the objectives in turn, identifying the key issues and what changes could be made to improve the management of young researchers, and effectiveness of the research base.

Several strong (interconnected) themes emerged:

- There was a general perception that young researchers from university departments could not use the skills and knowledge they had acquired to greatest effect outside of academe.
- Current training for PhD students (through the GRAD programme) was highly rated.
- The drive to publish in peer-reviewed journals for the RAE was seen to be at the expense of good management of the workforce, links with industry and other sectors, interdisciplinary research and helping to improve the public understanding of science.
- Silo-based disciplinary research structures and educational courses were also limiting interdisciplinary research.
- There was a sense that postdocs feel undervalued, with few chances to move-on from the sort of 'bench work' undertaken during a PhD and increase their responsibility. The vision of researchers from the Roberts report was still a long way off.
- It was recognised that the UK must continue to deliver world-class, peer-reviewed, research. This should not be compromised.

The group work identified some key specific actions that could be taken which would improve the utilisation of young researchers and effectiveness of the research base:

- External placements during PhD, and internships for postdocs, working with industry, education, media etc to improve understanding of what people from other sectors can offer.
- The high quality skills training available for PhDs should be expanded, and offered to postdocs.
- Undergraduate courses should include components from other disciplines, and cross-disciplinary working should be encouraged at post-grad/doc level; should consider more issue-based research.
- A four-year PhD would allow for an external placement, give more time to acquire research skills across different fields, and deliver individuals better acquainted with the research environment and more able to make informed decisions about their careers.
- Postdocs should be given more occasions to take responsibility – allowed to act as co-Principal Investigators on research projects, or given greater opportunity to apply for grants themselves.
- Research should be valued when it results in outcomes other than publications in specific peer-reviewed journals, such as working with industry, articles aimed at wider audience, or feeding into development of government policy.

Other messages that came from the groups included:

### **Skills/training**

Young researchers do acquire skills, but not always the right ones at the right time

The skills attained during research career aren't recognised sufficiently by those outside of academe

Requirement that young researchers need to build up skills not recognised by supervisors/Principal Investigators

Allow researchers in general to increase experience, working in other sectors and university departments

Engineering Doctorate (EngD)<sup>44</sup> has helped to develop skills set through modular training, as well as develop research expertise/subject specific knowledge

Give access to more *high quality* 'soft skills' training, more summer schools, both to PhDs and postdocs

Allow more opportunities to use skills (e.g. writing, presenting, teaching), and have ability assessed – so that skills can be recognised by others

Encourage self assessment of requirements, but be careful that disproportionate bureaucratic burdens aren't placed on researchers

### **Career pathways**

Recognise different roles young researchers may have – bench scientist, Principal Investigator, lecturer

PhDs/postdocs need better careers advice and information

Role for mentors – organised through professional bodies?

Research fellowships should last more than three years

Universities need to be more family friendly

Transitional grants (RAE-exempt) to allow mobility between sectors, and life stages (parenthood)

### **Funding arrangements/research base structures**

Funding of more fellowships should not be at the expense of grant-funded research

Education/research should be more 'issue' based

Interdisciplinary research perceived to have lower impact

Research institutes (attached to, or within, a university) can provide critical mass in key areas

There shouldn't be a barrier to postdocs applying for grants which fund their salary

Society's perception of science must be improved over the next 20 years.

Principle of the EU's 'thematic networks' good (though administrative load too heavy in practice) – could translate to a UK model

**CST Secretariat  
August 2006**

---

<sup>44</sup> <http://www.epsrc.ac.uk/PostgraduateTraining/EngineeringDoctorates/default.htm>

## Appendix – Attendees

### **CST members**

Geoffrey Boulton  
Wendy Hall  
Sue Ion  
Kathy Sykes

#### *Secretariat:*

George Pritchard  
Jonathan Radcliffe

### **'Young researchers'**

Alan Barr	Lecturer, High Energy Physics, University College London
Kate Bishop	Royal Society Dorothy Hodgkin Fellow; Infectious Diseases, Kings College London
John Bothwell	Postdoc, Marine Biological Association
Patrick Degenaar	Lecturer in Neurobionics, Imperial College London
Manolis Dermitzakis	Investigator, Population and Comparative Genomics, The Wellcome Trust Sanger Institute
Simon Felton	General Secretary, National Postgraduate Committee
Lee Higham	Marie Curie research fellow, University College Dublin
Matthew Hurles	Genome Dynamics and Evolution Group, The Wellcome Trust Sanger Institute
Sarah Lowdell	PhD student, Imperial College
Alex Martin	EngD student in Environmental Technology, University of Surrey/Brunel University and Sony Computer Entertainment Europe
Bruce Osborne	Nexia Solutions
Ian Pegg	EngD student with Buro Happold and Brunel University
Nicky Ragge	Senior Surgical Scientist, Oxford University
Kay Robinson	Schlumberger Cambridge Research
Fiona Sanderson	Conservation Science Department, RSPB
Dominik Schmidt	BBSRC Postdoctoral Training Fellow, John Innes Centre
Sandra Shefelbine	Lecturer, Department of Bioengineering, Imperial College London
Hayaatun Sillem	Committee Specialist, House of Commons S&T Committee
Jenny Steere	Academy of Medical Sciences
Angela Venters	Office of Science and Innovation

**Officials**

Iain Cameron	Head of Research Careers and Diversity unit, RCUK
Sarah Revell	Royal Society
Louise Williams	The Wellcome Trust

## Annex B – Work of others

### National policy documents

The UK GRAD Programme website gives an excellent account of national initiatives that are impacting on the provision of research degree programmes (RDP) and researcher careers in the UK.<sup>45</sup> Some of the key publications are given below.

The recent history of measures which have concerned researchers begins with the ‘**concordat**’ which provided a framework for the career management of contract research staff in universities and colleges. It was agreed by the higher education sector in 1996, with progress monitored by the Research Careers Initiative (RCI).<sup>46</sup> The RCI was chaired by Sir Gareth Roberts, and delivered its final report in 2002.

**Sir Gareth Roberts** reviewed the supply of people with science, technology, engineering and mathematics skills in his report for the Chancellor in July 2002, drawing heavily on the framework established by the concordat and the work of the RCI. The review covered the supply side – from school to employment in higher education and elsewhere. The key recommendations for postgraduate education were an increase in PhD stipend, and to better equip PhD students with skills that would meet their long-term needs. Consequently, PhD stipends from Research Councils have been raised substantially, and new training programmes well received.

The review found that employment in higher education was not an attractive career path for many of the brightest PhD graduates, and had concerns over the quality of some taking up employment as postdoctoral researchers and then as permanent members of academic staff. Specifically a lack of a clear career structure and uncertain career prospects, unsatisfactory training in the skills required either in an academic career or in a business research environment, and increasingly uncompetitive salaries act as a disincentive to work as a contract researcher.

Recommendations sought to enhance salaries in disciplines where there were shortages, develop a range of careers trajectories in academia, and allow for training within research grants awarded which employed contract research staff (CRS).

The work of the RCI was taken on by the **Research Careers Committee**, a subgroup of the Research Base Funders Forum, which includes representatives from charities, industry, Research Councils, Funding Councils, Regional Development Agencies, the Higher Education sector and Government departments.

In March 2006, a report scoping a “**Research Career Mapping Tool**”, as conceived by the Research Careers Committee, was published. It aimed to “provide a national resource to support research staff and research careers in the UK to complement, promote and act as a fast track to existing provision particularly within the university sector.”<sup>47</sup>

---

45 The UK GRAD Programme has the aim “to support the academic sector to embed personal and professional skills development into research degree programmes”. Its vision is “for all postgraduate researchers to be fully equipped and encouraged to complete their studies and to make a successful transition to their future careers.” Details of national policy initiative can be found at [http://www.grad.ac.uk/cms/ShowPage/Home\\_page/Policy/National\\_policy/p!egipmdl](http://www.grad.ac.uk/cms/ShowPage/Home_page/Policy/National_policy/p!egipmdl).

46 Reports of the Research Careers Initiative available at <http://www.universitiesuk.ac.uk/activities/rci.asp>.

47 A full set of documents from the Concordat to the Research careers Committee available from [http://www.grad.ac.uk/cms/ShowPage/Home\\_page/Policy/National\\_policy/Researcher\\_careers\\_\\_including\\_the\\_RCI/p!eigmpfk](http://www.grad.ac.uk/cms/ShowPage/Home_page/Policy/National_policy/Researcher_careers__including_the_RCI/p!eigmpfk).

The **Higher Education Funding Council for England** (HEFCE) funded a partnership of 17 universities “to research and develop career management processes to Contract Researchers, and their managers, in longer term career planning via the development of personal and professional skills”.<sup>48</sup> The final report “Supporting Research Staff; Making a difference” was published in January 2003. As Sir Gareth Roberts noted in the Foreword, the report “identified and demonstrated the practical steps” that needed to be taken to support the personal and career development of research staff. However, it does not appear to have been implemented by HEFCE.

In January 2007, **Research Councils UK** (RCUK) published a ‘Research Careers and Diversity Strategy’.<sup>49</sup> It had three overarching aims:

- To ensure that the best potential researchers are attracted into research careers;
- To help universities to improve the quality of their research training and improve the employability of early stage researchers; and
- To improve retention of the best researchers by promoting better career development and management of research staff in research organisations;

and two cross-cutting aims:

- To promote diversity within the research workforce at all levels and in the governance of research; and
- To enhance the attractiveness of the UK as a destination for the best researchers.

This was followed by a **draft revised concordat**, from RCUK and Universities UK, published for consultation in July 2007.<sup>50</sup>

The **Quality Assurance Agency for Higher Education** (QAA) Code of Practice for the assurance of academic quality and standards in higher education.<sup>51</sup> Section 1 dealing with ‘Postgraduate research programmes’ is designed to be student-centred so that researchers can be confident about what they can expect from institutions and know what their own responsibilities are. It was updated in September 2004 to take account of institutions’ practical experience of using the guidance contained in its predecessor, and a number of earlier reports.<sup>52</sup>

---

48 <http://gmpcrs.group.shef.ac.uk/>

49 <http://www.rcuk.ac.uk/rescareer/strategy.htm>

50 Available at <http://www.rcuk.ac.uk/news/draftconcordat.htm>.

51 <http://www.qaa.ac.uk/academicinfrastructure/codeOfPractice/default.asp> and [http://www.grad.ac.uk/cms/ShowPage/Home\\_page/Policy/National\\_policy/QAA\\_code\\_of\\_practice/p!eLaeXjl](http://www.grad.ac.uk/cms/ShowPage/Home_page/Policy/National_policy/QAA_code_of_practice/p!eLaeXjl)

52 Details at [http://www.grad.ac.uk/cms/ShowPage/Home\\_page/Policy/National\\_policy/QAA\\_code\\_of\\_practice/p!eLaeXjl](http://www.grad.ac.uk/cms/ShowPage/Home_page/Policy/National_policy/QAA_code_of_practice/p!eLaeXjl).

## The work of the Learned Societies

The **Royal Society** Higher Education Working Group project “Science Higher Education in 2015 and beyond” is considering whether the overall Science, Technology and Mathematics Higher Education provision in the UK will be fit for purpose by the second half of the next decade.<sup>53</sup> Some aspects of postgraduate study are included in their work.

The **Academy of Medical Sciences** report ‘The Freedom to Succeed’, published in July 2005, examined non-clinical research fellowships in the biomedical sciences.<sup>54</sup> The authors concluded that funders should “concentrate on improving the quality of existing schemes, rather than increasing the number of places available.”

The **Wellcome Trust** convened a meeting ‘Radical Thinking, Creative Solutions – Career Issues for UK Academic Research’ in July 2001.<sup>55</sup> Amongst the ‘calls to action’ was a recommendation that research PIs in universities be persuaded of their direct responsibility for management of research staff.

---

53 <http://www.royalsoc.ac.uk/page.asp?changes=0&latest=1&id=4732>

54 <http://www.acmedsci.ac.uk/p118pressid12.html>

55 <http://www.wellcome.ac.uk/assets/wtd003196.pdf>









