



RCUK Review of UK Physics Submissions from Unions Representing University Staff

This evidence is submitted by Unite the Union. Unite is the UK's largest trade union with 2 million members across the private and public sectors. The union's members work in a range of industries including manufacturing, financial services, print, media, energy generation, construction, transport and local government, agriculture, education, health and not for profit sectors.

Unite welcomes the chance to submit evidence and would be willing to make further written and verbal submissions about any of the issues raised.

Executive Summary

- **Unite is a major stake holder in the future of physics.**
- **Physics in the UK currently has a world leading international standing - this should be supported.**
- **There need to be national career pathways and effective investment in scientific technical staff across the UK.**
- **There needs to be a more sustainable system of funding for physics in the UK.**

- Physics is important for other sectors of the economy including engineering, manufacturing and finance as it strengthens the government aim to build a high value and highly skilled economy.
- More needs to be done to increase the numbers of people studying physics in the UK. This is especially true for people from low income backgrounds and women.

The Unite case in detail

1. Please provide a description of the origins of the Union and an overview of its present day functions.

1.1 Unite the Union is the UK's largest trade union with 2 million members across nearly all sectors of the UK economy. Unite has been formed by a series of mergers (most recently between the Transport and General Workers Union and Amicus) that bring together numerous types of workers in higher education, schools, science, technology, engineering and manufacturing.

1.2 Unite is the main union representing scientific technicians and academic related staff in the UK and Republic of Ireland. It is therefore a major stakeholder in all decisions around science and technology funding and development. At the same time Unite has a strong interest in the link between physics and other sciences and industry. From health to engineering and finance many of the skills and research findings from UK Physics can directly impact on developments of other industrial sectors and the image and strength of the UK economy as a whole.

2. Describe the support the Union gives to employees associated with the academic study of physics and research in the field, including examples if appropriate.

2.1 Unite is the main union for academic related and scientific technical staff across higher education, schools, research bodies and in the private sector.

2.2 In addition to the core union business of defending pay and conditions, health and safety, equalities and representing members in grievance and disciplinary matters, the union also runs significant campaigns and lobbying work around issues facing members.

2.3 In relation to physics and science Unite has been campaigning for a national training programme for scientific technicians particularly in higher education as well as sustainable funding for permanent technical staff.

2.4 At school level Unite has been campaigning for a clear career development framework for technicians and is a supporter of the Skills4Schools campaign¹. In addition Unite supports the Royal Society position that if some technicians choose to go into the classroom via the pedagogical route, this must not be at the expense of technical support for science departments.

2.5 At higher education and research level Unite has been working to reverse the trend of sustained and significant loss of permanently funded technical staff. A Royal Society report in 1998² found that core-funded technical staff numbers had fallen by 28 per cent in the 1980s and concluded that "there must be no further reduction in technical and research support". This was followed by a further report by Evidence Ltd to the Higher Education Funding Council for England³ that showed a further 15-20 per cent loss of core technical support between 1996 and 2001. Unite has found little evidence that the issues highlighted have been addressed.

¹ <http://www.skills4schools.org.uk/page.asp?id=75>

² The Royal Society, *Technical and Research Support in the Modern Laboratory* 1998

³ Hefce and Evidence Ltd. *Highly skilled technicians in higher education 2004*.
http://www.hefce.ac.uk/pubs/RDreports/2004/rd07_04/

2.6 Highly skilled technical support is essential to good academic research. However, formal opportunities for technicians to obtain training are piecemeal. Training is too often seen as cost rather than an investment. This is compounded by poor systems of career development, low comparative pay, under-funding and difficulties with staff recruitment and retention in the sector.

2.7 In addition the new market ethos in academic funding - notably competition linked to RAE grades - has led to an increase in short-term contracts, a narrowing of the teaching spectrum as well as a loss of positions and skills in under-funded areas.

2.8 The result is that there is an accelerating skills shortage - the average age of higher education technicians is over 40 with approximately 30% now over 50⁴.

2.9 Unite members report that technicians are often the first to go in compulsory redundancy situations and their roles are being covered by PhD students as a cheap solution.

2.10 Such a loss of technical support has several effects, not least on research and teaching. Technical staff are frequently responsible for monitoring and maintaining health and safety in departments, as well as providing in-lab supervision for PhD and undergraduate students. They are usually the most knowledgeable staff regarding suppliers of consumables and apparatus, thereby stretching tight budgets to maximum effect. This ensures that academic staff can pursue research and teaching more effectively. If there are fewer technicians to do these jobs, then academics have to bear the additional burden.

2.11 Due to this Unite has been supportive of the development of the Higher Education and Technicians Educational Development (HEaTED) project which aims to create a professional body for technical and specialist

⁴ *'Staff employed at HEFCE funded HEIs,' HEFCE Report 2005*

staff in higher education and science. Unite is supporting calls for potential apprenticeships in science at all levels along with other lifelong learning initiatives. The RCUK review should add its voice to these calls.

3. Please describe any concerns you have about the long-term health of the physics discipline. Please explain how these concerns might be overcome.

3.1 The issues facing technical staff are in part a symptom of a wider concern. There is a need to create a more sustainable system for funding physics and science in general. The unexpected £80 million shortfall in physics funding announced in December last year has highlighted how vulnerable physics infrastructure can be.

3.2 Unite has broadly been pleased about the increased levels of funding that has gone into science over the last 10 years. CSR 07 confirmed that total public investment in the science base will rise from £5.4bn in 2007-8 to reach £6.3bn by 2010-11, meeting the Government's commitment to increase investment in the public science base in line with the trend rate of growth in the economy.

3.3 This trend, however, has not been equal for different sciences. There is a marked contrast between the recent 10.8 per cent increase in Medical Research Council funding compared to the real terms budget freeze in Engineering and Physical Sciences Research Council and the 1.5 per cent cut in the Science and Technology Facilities Council (STFC) funds⁵.

3.4 There are more than half a dozen universities that depend on STFC for about 75% of their funding or more and many others with about 50% of their funding. Some universities are standing to lose about three quarters of a

⁵ This assumes a 2% increase in CPI inflation, as set out in government targets. In fact, RPI inflation is set to be above 3% for much of 2008, making the effects of this real terms cut worse.

million pounds a year as a result of these cuts⁶. At the same time the extra £75 million of HEFCE funding for teaching on certain subjects including physics is due to end at the end of the next academic year.

3.5 Unless this money is plugged and a more sustainable system of funding is put in place there will be some major closures and redundancies over the next year doing far reaching and long-term damage to UK physics capacity.

3.6 It is also important to note that in most institutions departments work very closely with each other often sharing infrastructure that is funded separately. For example in Glasgow there are potential cuts in the particle physics department which will have knock on effects on the nano-electronics and bio-electronics departments that all share the same facility.

3.7 Unite members know from bitter experience that support staff and technicians in particular are often the first to be cut. There have already been statements from senior figures in universities indicating this to be the case⁷. At the same time these cuts will decimate important research centres in Daresbury, Edinburgh and the Rutherford Appleton Laboratory (RAL). As they currently stand these are major centres of scientific research employing hundreds of highly skilled workers and scientists.

3.8 Physics infrastructure and the skilled staff who work in physics are not easily replaceable and it is therefore crucial that some protections are put in place to secure sustainable and long-term investment. A Unite representative at Daresbury laboratory commenting on the expected 300 job losses commented that “its not like you can advertise in your local paper for an experienced synchrotron radiation specialist and expect any responses – when these people are gone they are mostly gone for good.”

⁶ Professor Peter Main, Director of Education and Science, Institute of Physics.

<http://www.publications.parliament.uk/pa/cm200708/cmselect/cmdius/uc215-i/uc21502.htm>

⁷ <http://www.liverpooldailypost.co.uk/liverpool-news/regional-news/2008/01/14/university-faces-losing-millions-in-research-grants-64375-20346343/>

Course and site closures impact on more than just scientific staff. Everyone whose work is linked to the physics infrastructure is affected including cleaners, security guards, school support, clerical and administrative staff. Major changes therefore have a major impact on local communities and economies. Not only do they leave large employment gaps to fill but their closure also acts as a disincentive to other organisations that might seek to locate near by.

3.9 Major decisions on the future of physics infrastructure and the research projects should not be cost driven. They should be made in the context of wider government scientific strategy with a full and effective consultation process and evidence on the impacts that such changes would have.

4. How valuable do you feel academic physics research is to the UK (consider both skills and research)?

4.1 Physics, astrophysics, astronomy and particle physics in the UK have an extremely high international reputation and significantly contribute to the UK's high science ratings. If you look at citations and publications these are areas with the highest international standing. They therefore significantly contribute to the strength and reputation of UK academia and the economy as a whole.

4.2 Many of the projects in the UK are leading edge and will contribute massively to future developments in scientific knowledge and technology. Unite members work on anything from fibre photonics in Bath, Exeter's work on extra solar planets and functional materials, to the big high profile projects in the so called "Golden Triangle" such as the Diamond and the ISIS II projects in Oxfordshire.

4.3 Unite does not claim to be expert in judging the merits of various scientific projects nationwide, not least because our members work across the country. Having said this, some recent decisions to close projects seem to be

questionable. For example, the yet unused ALICE project in Daresbury which has already cost the tax-payer between £25-30 million to build is due to be cut. Unite members report that it would only cost £3 million a year to run and the potential resulting research would have implications for other projects worldwide including cancer research. Other projects under threat include an upgrade to the Merlin radio telescope array (e-Merlin) at Jodrell Bank and the UK infra-red telescope – the world’s largest telescope dedicated to infra-red astronomy, based in Hawaii.

4.4 While high profile science such as astrophysics, particle physics and string theory are the subjects that often draw new students into physics degrees, physics students do not just go on to work in the field of physics. Many go on to work for the engineering, manufacturing, medicine and financial sectors. Companies actively recruit from the physics community because the skills they learn are highly sought after and transferable. For example work on nano-science and catalysts has majorly benefited the electronics industry as well as solar cell production and the automotive industries.

4.5 Unite strongly believes that physics and other science subjects need to be properly supported if the UK is to achieve its aim of being a highly skilled science and technology economy.

4.6 Government strategy for a high value, highly skilled economy (Lisbon strategy) is predicated on a high number of highly educated, highly skilled workers being produced in the UK. The provision of science, technology and maths courses at university is a vital way the UK will retain the high value manufacturing base that is crucial to the future sustainability of the UK economy. There are huge numbers of highly educated science and maths graduates being produced in China and India, the implications of any move by UK companies to facilitate the use of this highly skilled low wage labour force will impact heavily on the retention of the intellectual property and innovation in the UK.

4.7 It should be stressed that many of the UK governments current priorities rely heavily on physics research for example climate change technologies, nuclear power and cancer research.

5. Looking at the review's terms of reference, please use detail any other issues or evidence you feel the Review Panel should consider in its assessment of the UK physics discipline and its long-term health.

5.1 Unite would strongly support work done to increase the numbers of UK students studying physics at all levels.

5.2 There are still substantial blockages in the supply of scientific and technically skilled applicants to university courses. The OECD rankings for upper secondary educational attainment in the population place the United Kingdom "13th position among 55-to-64-year-olds in the 30 OECD countries (i.e. those who completed school some 40 years ago), but only the 23rd position among 25-to-34-year-olds, who completed school a decade ago." ⁸ It also predicted significant improvements in countries like Korea who are now world leaders among 25-34 year-olds. Similarly a report published by the Royal Society⁹ earlier this year found that there has been a significant drop over the past 10 years in the proportion of UK students studying doctorates in science, from 65 per cent to 57 per cent of all PhDs awarded to home students.

5.3 The UK's standing in upper secondary education is leading to skills shortages in the British economy and will have potentially serious knock on effects if not addressed soon. We are already seeing high profile closures of scientific departments such as Reading's physics department, due to lack of applicants and funds. Unite members report problems with physics departments in Newcastle and Aberdeen as well.

⁸ The economic impact of UK higher education institutions,' Universities UK, May 2006

⁹ <http://www.independent.co.uk/student/postgraduate/postgraduate-study/how-can-the-hard-sciences-attract-more-phd-students-806720.html>

5.4 International students are an important part of the UK's student population and provide welcome added income for many universities. To attract international students in the long term however UK universities need to do more to safeguard their own long term sustainability which will require at least maintaining the numbers of UK born students going into courses.

5.5 There therefore needs to be a serious drive to get more students from under-represented sectors of society into scientific, maths and engineering courses at schools and further education in order to improve the numbers going on to university.

5.6 One positive step would be to recruit more science teachers and other scientific role models for children. In particular Unite believes that the role of technicians in schools is critical. Technicians help strengthen the role of practical work in class which often acts to enthuse and inspire school students to take a more active interest in physics.

5.7 Women in particular are under-represented at work in Science Engineering and Technology (SET) roles. Only 14% of science and technology professionals are women¹⁰. At undergraduate and postgraduate level, only 14 per cent of engineering and technology students, 24 per cent of computer science students and 22 per cent of physicists are women.¹¹ After graduation, these women graduates are also less likely to pursue a career in SET¹² and less likely than men to be promoted to senior positions. Women comprise less than 6% of the most senior grade staff in SET in institutions of higher education across Europe.¹³

5.8 At the same time there needs to be greater work done to increase access from lower income groups and people from underrepresented minority backgrounds as well as strategies to promote non-traditional roots into physics. The specific skills needed for certain industrial sectors could be

¹⁰ p.11, 'Shaping a Fairer Future' Women and Work Commission (2006)

¹¹ p.12, Women and Work Commission report (2006)

¹² P.7 'Tackling stereotypes: Maximising the potential of women in SET' WiTEC UK (2005)

¹³ p.1 'Role Models in the Media' Kitzinger et al (2008)

boosted though bringing physics into lifelong learning initiatives and the development of specialist science based courses in conjunction with sector skills councils and trade unions.

29/04/2008

Roger Jeary
Director of Research
Transport House
128 Theobalds Road
Holborn, London
WC1X 8TN

For clarifications or further information please contact:

James Lazou, Research Officer

E-mail: James.Lazou@unitetheunion.com

Tel: 020 7780 4020

Luke Moody
Research Councils UK
Polaris House, North Star Avenue
Swindon, Wiltshire SN2 1ET
United Kingdom
physicsreview@rcuk.ac.uk