

SUSTAINABILITY OF THE UK RESEARCH WORKFORCE ANNUAL REPORT TO THE UK RESEARCH BASE FUNDERS FORUM 2009

EXECUTIVE SUMMARY

1. This report combines the previous Health of Disciplines Reports and the Researchers: What is the situation? Reports. The main underlying purposes behind providing the data and description of these reports was to ensure that the effective “supply chain” of researchers across the different disciplines is understood and managed to be able to support the overall research requirements and strategy within the UK.
2. Initially the report considers the general health of the research base by considering academic staff numbers by discipline, the age profile of academic staff and the percentage of overseas academics. Numbers of permanent academic staff in all disciplines rose over the period 2003 to 2007; as did the number of staff aged above 60; and the numbers of overseas academics.
3. Demand is then covered looking at recruitment and retention of academic staff and the demand for STEM skills. On the whole recruitment and retention is not a major problem for the majority of HEIs. Problems do exist but tend to be confined to specific occupational groups or academic subject areas. The main recruitment difficulties expressed by employers are broad concerns about a lack of well rounded candidates with technical skills, broader competencies, such as mathematical capability, and practical work experience.
4. Supply into academic stock then provides information on first degrees awarded, postgraduate researchers, including student’s views on their experience, strategically important and vulnerable subjects; and building the evidence of their impact through the RCUK Doctoral Cohort Study. The numbers of first degrees and doctorates awarded both continue to increase; and an increasing number of postgraduate research students (84% of respondents in 2009) state that their experience met or exceeded their expectations.
5. Widening participation and equality, including gender are important areas for consideration in ensuring the supply of the best researchers into the UK research base. The RCUK analysis of participation of females from undergraduate to professor has been continued, details in Annex 2.
6. The report then considers researchers and highlights the major activities by the sector in this area particularly around the Concordat to Support the Career Development of Researchers and its implementation by the sector.
7. Details of Research Councils concerns and activities relating to the health of the UK research base conclude the information provided in the report.

8. The conclusions of the report note:

- the range of activities that are intended to help inform the UK research community and policy makers about the sustainability of the UK research workforce.
- that the UK research base is continuing to perform to a very high standard although there are still features which give rise for concern.
- The long term growth in numbers of academic staff requires consideration.

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Background

1. In 2005, the Funders' Forum asked a small working group to look at the current situation regarding research staff in the UK and report back annually; two reports 'Researchers: What is the situation?' in 2006 and 2007 have been considered.
2. At the same time the Funders Forum agreed that its responsibilities for monitoring the health of disciplines could be met by an annual examination of data on numbers of researchers and age profiles in disciplines, annual updates from the Research Councils and biennial recruitment surveys. They also requested relevant information on business concerns about the supply of researchers. Three reports have been published to date, in 2006, 2007 and 2008.
3. There are a number of key paragraphs and recommendations within the five published reports that help identify what should be contained in any future report.
4. Health of Disciplines 2008 paragraph 3: "The Funders' Forum is asked to note the large number of reports being produced in this area including the Royal Society's 'A degree of concern' and work of the newly reformed HEFCE Strategic Subject Group and consider the role of this report in the context of other work in this area."
5. The third report built on the analysis presented previously in 2006 and 2007. The 2008 report did not contain new data (with the understanding that data would now be updated on a biennial basis). However, as specifically requested by the Funders' Forum following the 2007 report, the 2008 report did include an analysis of the percentage of overseas academics by discipline.
6. Researchers – What is the Situation? 2007 Recommendation 2: "There is still much work to be done in understanding how national statistical data can help inform the supply chain of highly skilled researchers in different sectors of the economy."
7. Researchers – What is the Situation? 2006 Recommendation 2: "We should build on the Health of Disciplines work, which is looking, for example, at trends in staff and student numbers."
8. One of the main underlying purposes behind providing the data contained in these two reports was to ensure that the effective "supply chain" of researchers across the different disciplines is understood and managed to be

able to support the overall research requirements and strategy within the UK. This covers the progress of research staff through various stages in their careers: undergraduates, postgraduates, researchers, lecturers and professors and data are required to understand the health of disciplines at all these levels. It is also important to provide data to help understand the career choices of researchers who leave the academic environment to pursue opportunities within private industry or the public sector (including government). This data needs to be presented to provide information by discipline and by career stage.

9. It is also important to consider the Science and Society agenda which aims to ensure there is an appropriate supply pipeline of science skills to the workforce and the Societal and Economic Impact mission to advance knowledge, understanding and technology (including the promotion and support of the exploitation of research outcomes), and provide trained researchers .
10. The ‘Thrift Report’ (Research Careers in the UK: A Review) recommends that “the Research Councils should develop consistent mechanisms to record demographic characteristics of their researcher communities and track successful early career researchers across specific disciplines in order to inform future funding strategies for early career researchers.
11. The Researchers:What is the situation report and the Health of Discipline report have been combined into a single report that concentrates on the “supply chain” flow from undergraduates to professors and senior researchers across different disciplines.
12. Future reports can expand on this to cover more detail on how this UK-based academic flow interacts with private sector industry and with overseas students and researchers and would sensibly be provided annually for the December meeting. The content and purpose of these reports shares a common alignment with other organisations suggesting that collaboration may be beneficial. Possible candidates for collaboration include the UK Funding Bodies, the Royal Society, The Wellcome Trust and sections of private sector industry.

CURRENT STOCK IN THE ACADEMIC RESEARCH BASE

Numbers of academic staff¹

13. An overview of the general health of the research base can be gained by considering staff numbers by discipline. Chart 1 shows the number of permanent academic staff in the UK by discipline for the period 2003/04 to

¹ Academic staff are defined by HESA as ‘academic professionals who are responsible for planning, directing and undertaking academic teaching and research within HE institutions. They also include vice-chancellors, medical practitioners, dentists, veterinarians and other health care professionals who undertake lecturing or research activities.’

2007/08. Chart 2 shows the percentage change in numbers of staff by discipline between 2003/04 to 2007/08².

14. The academic community in the UK is made up of around 141,000 FTE staff. The total number of academic staff (employed in all disciplines) rose by 14% over the period 2003/04 to 2007/08; compared to a rise of 20% over the period 1998/9 to 2004/5.

- Mass communications and documentation (33 per cent), 'other physical sciences' (28 per cent), creative arts and design (27 per cent) and education (26 per cent) showed notable growth over the period.
- Numbers in all disciplines rose over the period where previously the numbers in chemistry, engineering & technology, medicine & dentistry, and social, political & economic studies declined during the period 1998/9 to 2004/5
- Numbers in veterinary science, agriculture and related subjects showed the slowest rate of growth with a 5 per cent increase over the period.

Age profiles

15. Chart 3 shows the age distribution of permanent academic staff in 2007/08 by discipline³. The proportion of total permanent academic staff (in all disciplines) aged over 60 has risen steadily over the period 2003/04 to 2006/07 from 6 per cent to 8 per cent (see Chart 4)⁴.

- In 2007/08, education had the highest proportion of permanent academic staff aged 55 or over (39 per cent), and the lowest proportion of permanent academic staff aged below 35 (9 per cent). When considering the age profiles of academic communities it is also necessary to take into account the structure of the particular community. In practice based disciplines, for example, education or social work, staff are generally required to work for a number of years before pursuing an academic research career. Therefore, such disciplines could expect to have an older age profile.
- Business and management studies, mathematical sciences, architecture/building/planning, languages, geography and social studies,

² Data supplied to RCUK by HESA

³ Data drawn from the HESA publication 'Resources of Higher Education Institutions 2007/08' (table 13, with reference to table 12 for actual figures to allow amalgamating percentages).

⁴ Data taken from table 22 of the HEFCE publication Staff employed at HEFCE-funded HEIs update: trends and profiles (2008/26). The HEFCE analysis for this report showed that between 2003/04 and 2006/07, the change in proportion of academic staff aged over 50 was minimal, therefore they focussed on changes in the number of staff aged over 60.

and creative arts and design all had over 20 per cent of their permanent academic staff aged 55 or over in 2007/08.

- Business and management studies, subjects allied to medicine, and creative arts and design all had less than 20 per cent of their permanent academic staff aged below 35 in 2007/08.

Percentage of overseas academics

16. After the 2007 Funders' Forum, it was requested that a figure showing the percentage of academics that are of non-UK nationality was included in future papers. This figure is included as Chart 5⁵. Main points to note are:

- Across all disciplines, except unknown and combined subjects, there has been an increase in the percentage of overseas academics between 2003/04 and 2006/07. Mathematics has seen the greatest percentage increase in overseas academics (6 per cent).
- Languages, mathematics, and unknown and combined subjects have the highest proportion of academics of non-UK nationality (each over 20 per cent). Education has the lowest proportion of staff from overseas (5 per cent).

17. The data groups social, political and economic study, however the disaggregated data may indicate a much higher proportion of overseas academics in Economics. The Demographic Review of Social Science that ESRC published in 2006 indicated that Economics had the highest proportion of overseas academics across social science disciplines and that just 45% of staff under 35 were UK nationals (based on 2004/05 HESA data).

DEMAND

HEI Recruitment

18. In recent years, surveys of recruitment and retention issues within the universities and colleges have been commissioned by the Universities and Colleges Employer Association (UCEA). The report is updated every three years with the latest report published in summer 2008.

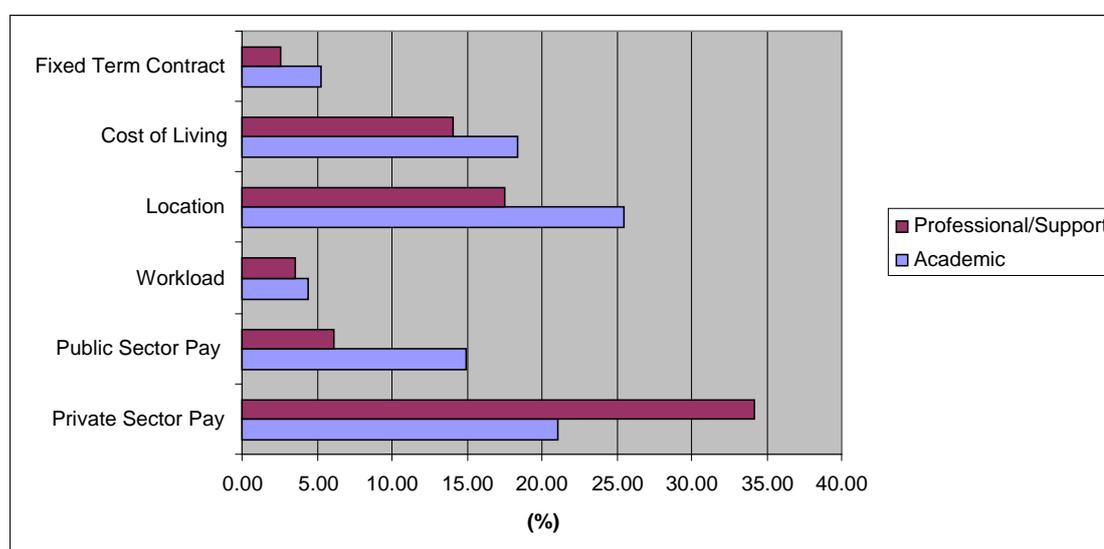
19. The survey results indicate that higher education institutions (HEIs) generally have relatively low labour turnover and that recruitment and retention difficulties are limited to particular occupations and academic disciplines. It also indicates that retention is less of a problem than recruitment, so that once staff are recruited they tend to stay. The survey also suggests that, since 2005, the employment situation has improved slightly with fewer HEIs reporting

⁵ Data from Chart 5 are from table 42 of the HEFCE report 'Staff employed at HEFCE-funded HEIs: update' (2008/26).

difficulties. Nonetheless, there remain some specific problem areas which HEIs are addressing through market supplements.

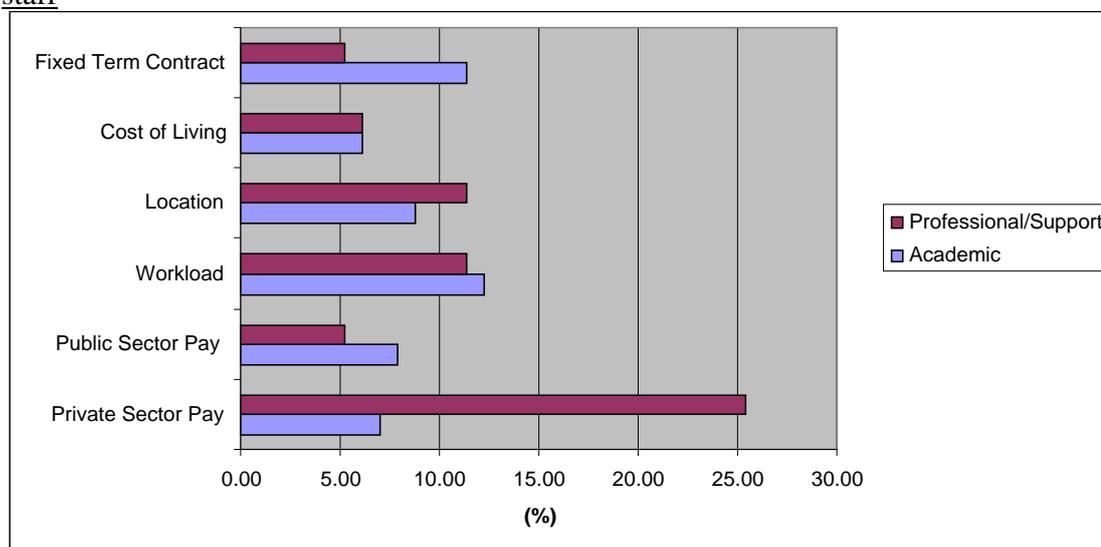
20. The majority of HEIs in the survey believed that the picture regarding recruitment and retention had largely remained the same over the past 12 months. The findings were similar in the last survey in 2005 but conditions overall seem to have improved slightly since then. Over a fifth of respondents to the survey believed that pay levels in the private sector were affecting the recruitment of academic staff, but this was down from a third of respondents in the 2005 survey.
21. Most subject areas for which academic recruitment shortages occurred were the same as in previous surveys; these included business/management, economics, accounting/finance and law. Differences this year include an increase in difficulty for biological sciences staff and a decline in difficulty for IT/computing staff.
22. ESRC is aware at a more detailed level that in economics the problem is a result of more lucrative opportunities for employment in the private sector. There is also a specific problem with appointing academics to posts in macroeconomics. In management the difficulty is most prominent in recruiting to more senior positions.

Figure 1: Factors impacting on ability to recruit academic staff and support staff



Source: UCEA survey of HEIs, 2008

Figure 2: Factors impacting on ability to retain academic staff and support staff



Source: UCEA survey of HEIs, 2008

The Demand for Science, Technology, Engineering and Mathematics (STEM) Skills

23. A good summary of the general situation on employer demand for STEM subjects is The Demand for Science, Technology, Engineering and Mathematics (STEM) Skills published in January 2009, commissioned by BIS (DIUS). The report mainly focuses on graduate level but contains useful information on the postgraduate picture. It includes information on recruitment difficulties, supply and earnings, and concludes with a summary of the difficulties in estimating future demand.

24. The main findings of the report are:

- Evidence from employers shows that there are specific recruitment difficulties in some STEM-related sectors in so far as employers report insufficient UK candidates in particular areas of the biosciences, engineering and IT of the quality they are seeking. To some extent these difficulties relate to the lack of applicants with specific STEM knowledge and qualifications.
- However, to a greater extent, the recruitment difficulties expressed by employers are broader concerns about a lack of well rounded candidates with technical skills, broader competencies, such as mathematical capability, and practical work experience.
- The supply of STEM graduates and postgraduates has increased in recent years. Between 2002/3 and 2006/07,
 - The number of STEM first Degree qualifiers from UK HEIs (excluding the Open University) increased by 11%;

- The number of STEM Other Undergraduate qualifiers increased by 24%;
- The number of STEM Masters qualifiers increased by 35%; and
- The number of STEM PhD qualifiers increased by 18%.
- However, there are differences between STEM subjects and at different qualification levels. For example, first degree qualifiers in medicine and dentistry increased by 34% whereas for chemistry and computer science there were falls of 10% and 11% respectively.

SUPPLY INTO ACADEMIC STOCK

Student populations⁶

25. The total number of first degrees⁷ awarded (in all disciplines) increased by approximately 15 per cent between 2003/04 and 2007/08 (see Chart 6). The total number of first degrees awarded in 2007/08 was approximately 335,000.

- Numbers in business & administrative studies remained high.
- Education (49 per cent) experienced the highest growth during this period.
- Computer science (-26 per cent) experienced the highest rate of decline in numbers, however this follows a 48% growth from 1998/9 to 2004/5
- Numbers in environmental science (-6 per cent), and veterinary science, agriculture and related subjects (-1 per cent) experienced decreases in the number of first degrees awarded

⁶ Data were taken from the Higher Education Statistics Agency (HESA) 'Students in Higher Education' annual publications (data for first degrees taken from table 15c, and data on doctorates from table 13a). Discipline categories reflect HESA subject areas, except that HESA's 'physical sciences' is disaggregated here into Chemistry, Physics, Environmental Science (science of aquatic and terrestrial environments, and physical geographical sciences), and other physical sciences (broadly-based programmes within physical sciences; materials science; forensic & archaeological science; astronomy; geology; others in physical sciences). In 2002/03 a new method of coding subject areas, using the Joint Academic Coding System (JACS), was introduced, and in 2003/04 a new staff record was introduced. Therefore 2003-04 was taken as the starting period for these time series to allow ready comparison between years.

⁷ 'First degrees' excludes other qualifications below degree level such as Foundation Degrees, diplomas, HNDs, HNCs, etc

Postgraduate Researchers

26. Chart 7 shows that the overall number of doctorates awarded between 2003/04 and 2007/08 increased by 9 per cent. Approximately 16,600 doctorates were awarded in 2007/08.
- All subjects, with the exception of chemistry, and veterinary science, agriculture & related subjects, saw an increase in the number of doctorates awarded over this period. But the sharp rises seen in many subjects between 1998/99 and 2004/05 (see 2007 report) have levelled out, with growth being much more modest in the period examined here.
 - Computer science and creative arts & design experienced the highest growth rates (see Chart 8).
 - Environmental science experienced relatively low growth in the number of doctorates awarded over the period.
27. PRES (the Postgraduate Research Experience Survey) is a Higher Education Academy online survey tool designed to collect feedback from current postgraduate research students in a systematic, user-friendly and comparative way. Development and testing of PRES has been overseen by a Steering Group which includes representatives from RCUK, QAA, HEFCE, Vitae, National Postgraduate Committee (NPC), the Higher Education Academy and HEIs. It was introduced in the UK in 2007, and has also run in 2008 and 2009 however in response to feedback from HEIs, the Steering Group and the Academy have decided that in future the survey will run every two years.
28. A total of 108 higher education institutions have taken part at least once over that 3-year period. 'Research students' are postgraduate students who are registered for research awards at UK higher education institutions (HEIs); the vast majority are on doctoral programmes and the rest on research Masters programmes (such as MPhil), either as a stepping stone to a doctorate or as an award in its own right.
29. Research students' views on skills development were among the most positive of all the responses to questions within PRES, with more than two-thirds agreeing with most questions. The most positive views were about improving their ability to learn independently and improving analytical skills. Two out of three agreed that they had adequate opportunities to further develop their research and transferable skills; this proportion increased more between 2007 and 2009 than other items.

Strategically important and vulnerable subjects

30. HEFCE currently consider the following subjects to be strategically important and vulnerable:

- science, technology, engineering and mathematics
- area studies and related minority languages, including:
 - Arabic and Turkish language studies and other Middle Eastern area studies, former Soviet Union Caucasus and central Asian area studies
 - Japanese, Chinese and other far eastern languages and area studies
 - courses relating to recent EU accession countries, especially those in Eastern Europe and the Baltic
- quantitative social science
- modern foreign languages.

31. HEFCE are supporting and developing a number of projects to address issues of student demand for STEM subjects deemed to be both strategically important and vulnerable. A national HE programme for STEM subjects, to be hosted by Birmingham University, will aim to deliver a sustained increase in STEM graduates and satisfy the need for higher-level skills in these subjects among employers.

Building Evidence of Researchers' Impact

32. The RCUK Doctoral Cohort Study aims to:

- Improve understanding of the value and impact of doctoral training
 - Data on the careers trajectories and impacts of the doctoral students
 - Clearer picture of the dominant career pathways
- Provide evidence of outcomes from investments in research training, eg for
 - UK society and the economy
 - Research and researchers

33. The study covers all UK doctorates as it uses the survey of longitudinal destinations of leavers of higher education (L DLHE) which provides information from PhD holders about their employment at around 40 months on from graduation.

34. The Research Councils commissioned analysis of the options for tracking the career pathways of doctorate holders⁸. An early step was enhancement of the L DLHE which ran in Winter 2008/09 and analysis is underway of the responses from graduates of higher degrees mainly by research⁹. This analysis

⁸ A report on options was provided in April 2008:

<http://www.rcuk.ac.uk/cmsweb/downloads/rcuk/researchcareers/opana.pdf>

⁹ Institute of Employment Studies are undertaking this for RCUK. The report will be available Winter 2009.

will also inform plans for gathering more detailed career profiles and tracking the cohort over the longer period. EPSRC are also commissioning a study of employer views that aims to “establish the economic impact of doctoral graduates and the extent to which they drive or contribute to innovation and growth in non-academic sectors”.

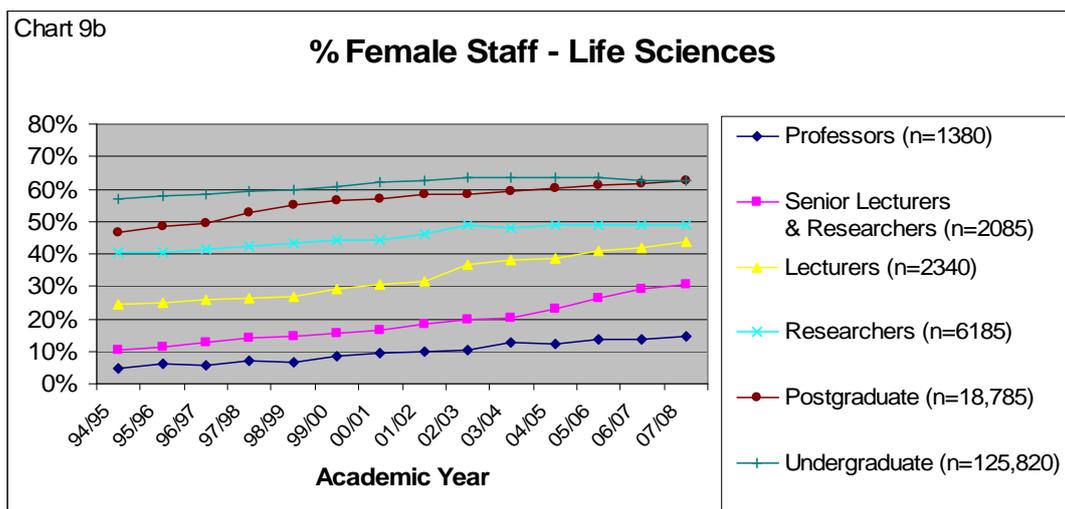
35. RCUK are in early discussion with BIS regarding about tracking the destinations of international students to ensure compatibility between the studies.

Widening Participation from Undergraduate to Post-graduate Research Degrees

36. The RCUK has had a widening participation research synthesis topic accepted through the ESRC synthesis programme, and the report is expected by spring 2010. A reasonable amount is known about the impact of widening participation on undergraduate degrees, much less on post-graduate studies. This review should highlight gaps and trends in the literature base, and where evidence allows, explore variables affecting participation in post-graduate research degrees.

Gender

37. RCUK has continued the analysis of the participation by females from undergraduate to professor by broad discipline. This data, compiled from various HESA publications, is presented in 11 separate charts in Annex 2 - a sample chart for the Life Sciences is shown below (n = total number (both male and female) at that career stage for the year 2007/08):



Equality

38. The Equality Challenge Unit working with HESA has developed an equality function within their Heidi data management tool, allowing users to easily access relevant equality data covering staff and students in a useful and targeted format. This can help practitioners identify and measure equality and diversity at their institution, and benchmark this against other institutions in the sector.
39. Heidi equality includes student, staff and destination data for years 2006/07 and 2007/08. Data can be used by practitioners to create reports highlighting the disability, ethnicity, gender and age breakdown of staff and students within their institution and compare this to other institutions in the sector. It includes 44 pre-loaded equality reports designed by ECU to assist practitioners to provide evidence specific to their institution.
40. The Equality Challenge Unit also produces Equality in Higher Education Statistical Reports annually. The 2009 analysis highlights continuing challenges for the sector as a whole. For example, although the representation of women within academic staff increased from 40.0% (03/04) to 42.6% (07/08), only 18.7% of heads of department/professors were women. Another significant finding is that, although the percentages of black and minority ethnic first-degree students achieving first and second class honours degrees have increased over the past five years, the attainment gap has become wider. Exploring the reasons for these inequalities provides an important basis for action to improve the experiences of all staff and students in higher education.

RESEARCHERS

41. Since the previous report there have been major activities by the sector particularly around the new Concordat.
42. The sector has agreed and either signed or supported the new Concordat to Support the Career Development of Researchers. The Concordat has been launched and a Research Concordat Strategy Group has been established to ensure effective implementation and review and to report annually to the Funders Forum. A separate paper covers the Concordat however a number of the Concordat benchmarking projects are relevant to this paper.
43. The Careers in Research Online Survey (CROS) was designed originally to support the Research Careers Initiative and has proved effective for the institutions that have participated in previous years; the data gathered has been central to improving the working conditions and career development of research staff. Over 60 organisations have taken part in CROS since it first ran in 2002. It is aimed at anonymously gathering data about working conditions, career aspirations and career development opportunities for research staff.

44. The survey questions have been revised to ensure that they map onto the principles of the Concordat so that the analysis of the results will assist with your institutions' implementation of the Concordat. The revision has also ensured that the survey aligns with the PRES (the Postgraduate Research Experience Survey and its governance). This work was taken forward by the CROS Steering Group which has representation from HEFCE, RCUK, Vitae, UCU, ReSDAG, UPA and the HEIs. CROS will be available annually from 2009.
45. The Careers in Research Online Survey (CROS) 2009 was run by 51 HEIs, including the majority of the Russell Group and the 1994 group of HEIs. Collectively, the institutions represented 74% of an estimated UK research staff population of approximately 38,000. The 5,908 responses equate to a 21% response rate for the target sample, or 16% of the total UK research staff population. Comparison of the demographic information with known information about the UK research staff population confirms that the respondents are representative. The high response rate, and strong statistical confidence afforded by the large sample size, suggests that responses will be representative of the UK research staff population.
46. Overall the messages from CROS are positive. Most researchers feel valued, are satisfied with their work-life balance and believe their institutions are committed to equality and diversity. Institutions appear to recognise the importance of supporting career development and there is clear improvement in the uptake of induction, appraisal, and training and development opportunities by research staff compared to previous CROS results.
47. Most research staff are integrated within their departmental research community, and stimulated by their institution's research culture. However, there is still much that could be done, particularly in institutions recognising the wider contributions of research staff, encouraging research staff to be more realistic in their career aspirations and to be more active in their career development planning.
48. There are groups of researchers, such as those who have had multiple, short-term contracts and/or long service through fixed-term contracts, who do not feel integrated within the institution, and report less positive feelings about their employer, job and career.
49. The Research Concordat Strategy Group has also agreed another two benchmarking projects which are of relevance: Understanding the research staff cohort, and Reviewing the use of fixed term contracts. Both projects are due to report in spring 2010.
50. The University and College Union produce reports from the HESA data on the percentage of research only staff on open-ended or fixed term contracts at

each HEI. These reports show the reduction in the overall level of fixed term contracts since 2003 to 2007.

51. The HEFCW First Annual Report on Research Staff which reports trends in research staff also confirms the reduction in fixed term contracts.

Research Councils UK

52. RCUK have been focussing on both people flow initiatives - internships, knowledge transfer partnerships etc. and to transferable skills training - through Roberts agenda - which are fundamental to ensuring researchers are prepared for a board range of careers and to ensure that researchers have opportunities to engage with users and realise the impact of their research.

AHRC

53. Most disciplines within the arts and humanities display characteristics which suggest that they are healthy and sustainable. However, there remains a lack of capacity within language and area studies, particularly within certain sub-disciplines (Chinese, Japanese, other Asian Studies, African, and modern Middle Eastern studies). However, there are some encouraging signs regarding the future sustainability of some of these subjects. There are also concerns over the proportion of law graduates entering professional practice rather than academia and the 2007 Science and Heritage report by the Lords Science and Technology Committee identified conservation science as an area of concern.

BBSRC

54. Bioscience research in the UK continues to thrive, but there are specific sub-disciplines where BBSRC has concern over vulnerabilities in the availability of expertise. There are also continuing concerns regarding the supply of bioscientists with the mathematical skills and broader interdisciplinary awareness needed for the future of bioscience and its translation into new innovations.
55. In regard to specific sub-disciplines, BBSRC launched a 'niche skills consultation' in May 2009 in association with the Biosciences Federation (now Society of Biology) in order to understand better how to address weaknesses in the supply of people with strategically important expertise, where the numbers of individuals needed may be small. The responses to the consultation were considered by BBSRC's Bioscience Skills and Careers panel, and its findings were published in October 2009 (the report, *Strategically Important and Vulnerable Capabilities in UK Bioscience* is available at:
http://www.bbsrc.ac.uk/organisation/policies/reviews/consultations/0905_bios

[science_research_skills.html](#)). The panel found evidence of weakness in the availability of expertise in whole animal physiology, industrial biotechnologies, plant and agricultural sciences (including agronomy, plant physiology, plant pathology, entomology), and systematics / taxonomy. The panel noted that action was already in hand by BBSRC or other partners in addressing the issues, but also made a number of further recommendations.

56. In relation to whole animal physiology, BBSRC is working with MRC to address shortages in the supply of individuals with *in vivo* skills training. However, the ability of HEIs to provide research training in this as well as other high-cost areas of biological science continues to be of concern. In the absence of full economic costing for research degree funding, there is a risk that HEIs will increasingly need to keep students away from expensive areas in order to control costs, whereas these are very often the crucial areas for the long-term health of UK biosciences.

EPSRC

57. The quality of engineering and physical science research in the UK is high. Some areas are now showing signs of increased recruitment of postgraduate students, although the situation does vary from discipline to discipline. Within the academic sector some specific gaps have been identified eg for statisticians and for process engineers. There continues to be evidence of difficulties in recruiting appropriately skilled people for business and industry. It is anticipated that there will be a continued need for skilled people in engineering and manufacturing. Examples include an increased need for skills in green technologies and environmental goods and services and some specific pharmaceutical skills.

ESRC

58. The social science base is very large and diverse with considerable variation in the health of the social science base. A number of disciplines have quite distinct needs - including practice linked disciplines facing significant capacity building problems as well as some research intensive disciplines confronted with recruitment and retention problems. There is also a general weakness across the social science base in quantitative methods. The ESRC currently identifies the following areas as experiencing sustainability issues: language based area studies, economics (including specific concerns in macro economics), education, empirical studies in law, management and business studies, social work and care and quantitative social science.
59. Social science: there continues to be strong demand for improving the quantitative skills base across all sectors. In particular, the social science research base is not producing the volume of quantitatively literate people to meet the needs of the non-academic research sectors, both within government and business.

MRC

60. Integrative physiology and pharmacology, clinical and translational research, and public health and health services research, are all areas in which there is a need for more trained researchers. MRC continues to take action to strengthen all these areas, where possible jointly with other funding agencies. Within these fields biostatistics, health economics, clinical, translational research, and in vivo sciences are all particular disciplines in which there are shortages of skilled people. Progress in medical research is also dependent on the strength of the research base in physics, chemistry and mathematics, and MRC remains concerned about the health of these disciplines too.

NERC

61. Many areas of NERC science are suffering from a shortage of individuals with strong quantitative skills and in particular, maths, physics and engineering expertise. There is a strong need to both encourage more young people to train in those disciplines, but then also to attract more of those trained people into environmental research. The shortage of these skills is affecting both the biological and physical aspects of environmental science.

62. Another major theme is the need for hybrid skills and translators – for example, individuals with both modelling skills and a wider environmental and biological understanding (observational and experimental). More skilled people are required to be able to manipulate medical data, linking the environment to human health. More expertise is also required in many other aspects of informatics, including hydro-informatics.

63. Hybrid skills are also required to improve technology. More trained people are needed to advance technology, process models etc. But as well as the technological knowledge, they also need to have the scientific knowledge and understand the application in the field. There is a need to interface with engineering designers to develop new instrumentation and technology.

64. More expertise is required to enable research into risk, probability and uncertainty. This requires integration of environmental scientists with both social scientists and modellers/statisticians.

65. Other skills shortages identified are:

- Integrated coastal zones, transition coastal rims, and waters – estuarine, tidal rivers
- Biogeochemistry/physics
- Chemists/biochemists/analytical chemistry

- Taxonomy - shortage particularly in Universities. Skills held in NHM/Kew etc. Practical “ology” skills – defining functional groups/know about more than one species.
 - Need to attract molecular biology/microbiology to work on environmental issues
66. NERC are currently leading on a Postgraduate Skills Review Project, in conjunction with fellow Environment Research Funders’ Forum (ERFF) members. The project is identifying the priority postgraduate skills requirements needed in the Environmental Sciences Sector (not specifically for Health of Disciplines) and will report early 2010. To date the project has already started identifying many of the issues above as being real skills needs for the sector. The final report will provide more detailed information about skills needs and will be used to inform the new NERC Training Strategy i.e. NERC will be investing in priority skills areas.

STFC

67. STFC’s main concern remains the lack of highly skilled technicians which is also high on the skills shortage lists of many companies nationally. The current trend towards a downturn in the UK research capacity in engineering and the physical sciences remains an overarching concern. Problems in filling vacancies at RAL continue to be experienced across a range of disciplines, but with particular difficulty in electrical designers, design engineers, mechanical/electrical technicians, computer science/software engineering.

Cross Council Priority Themes

68. All RCUK priority themes have objectives to increase capacity and capability of the research areas which include increased training of postgraduate students, and support for individual fellowships.

CONCLUSIONS

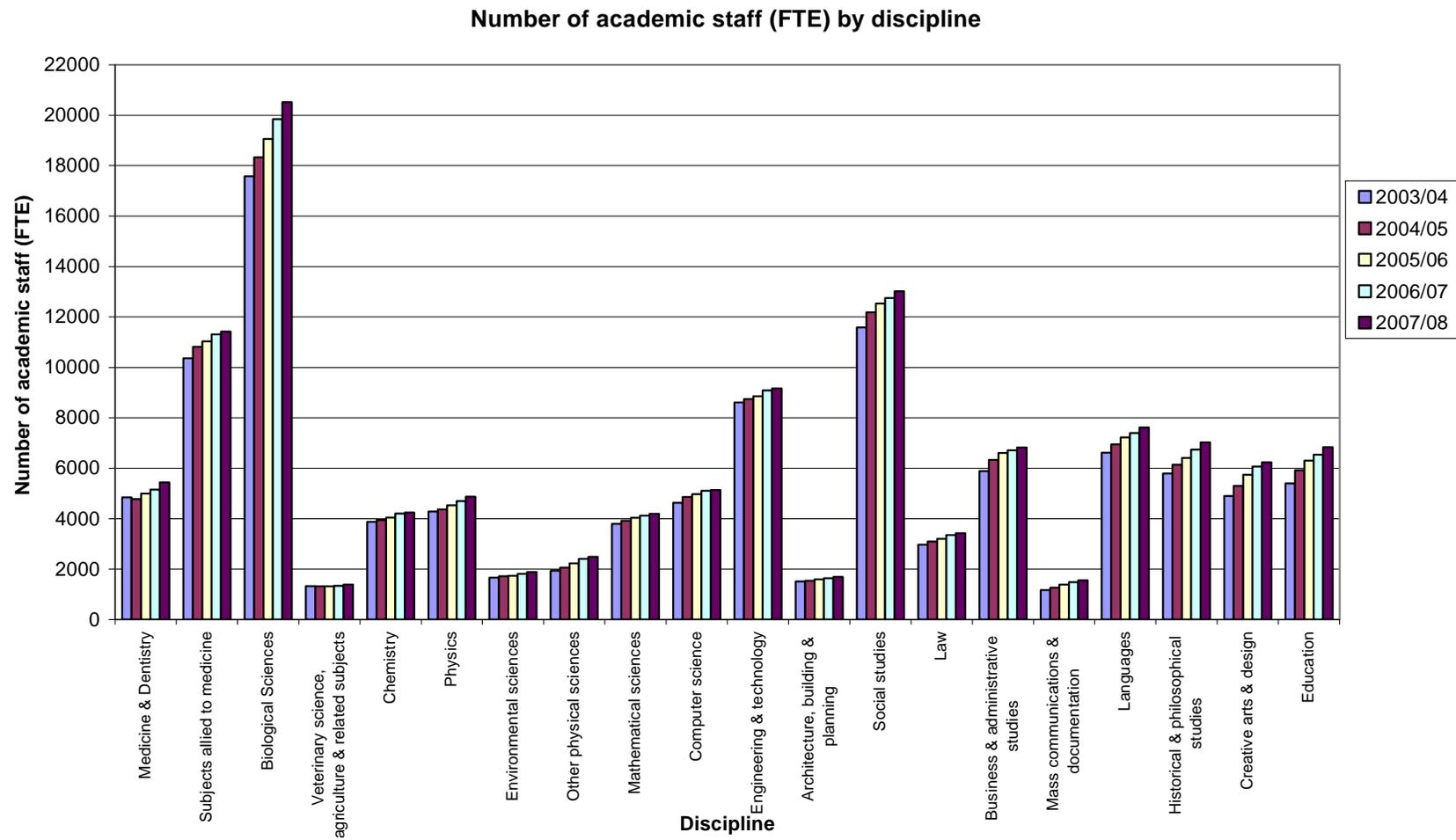
69. This report shows, there is a range of activity that is intended to help inform the UK research community and policy makers about the sustainability of the UK research workforce and many in the sector are working together on various aspects and are embedding these activities in normal business. There is still work to be done in understanding how national statistical data can help inform the supply chain of highly skilled researchers in different sectors of the economy.
70. The UK research base is continuing to perform to a very high standard, with exceptional strength in many sectors, in which it continues to be ranked at least second in the world on major output indicators. Nevertheless, there are still features of the UK research system which give rise for concern, and a

number of disciplines and sub-disciplines which continue to be particularly adversely affected by them.

71. The long term growth in the numbers of academic staff across the disciplines is increasing and the sector needs to consider whether this is sustainable in the current economic downturn.

Annex 1: Charts

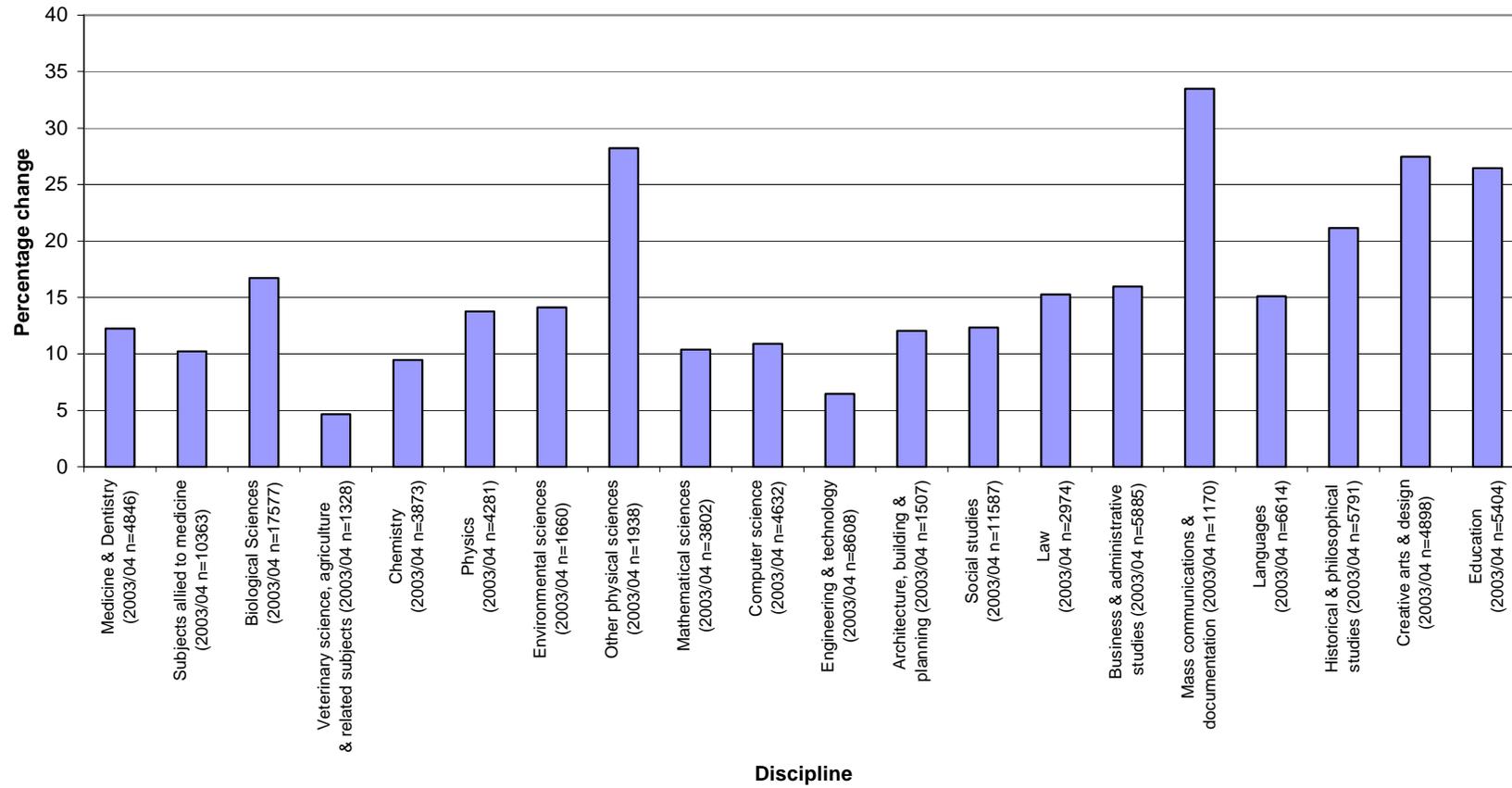
Chart 1



Compiled using data supplied to RCUK by HESA

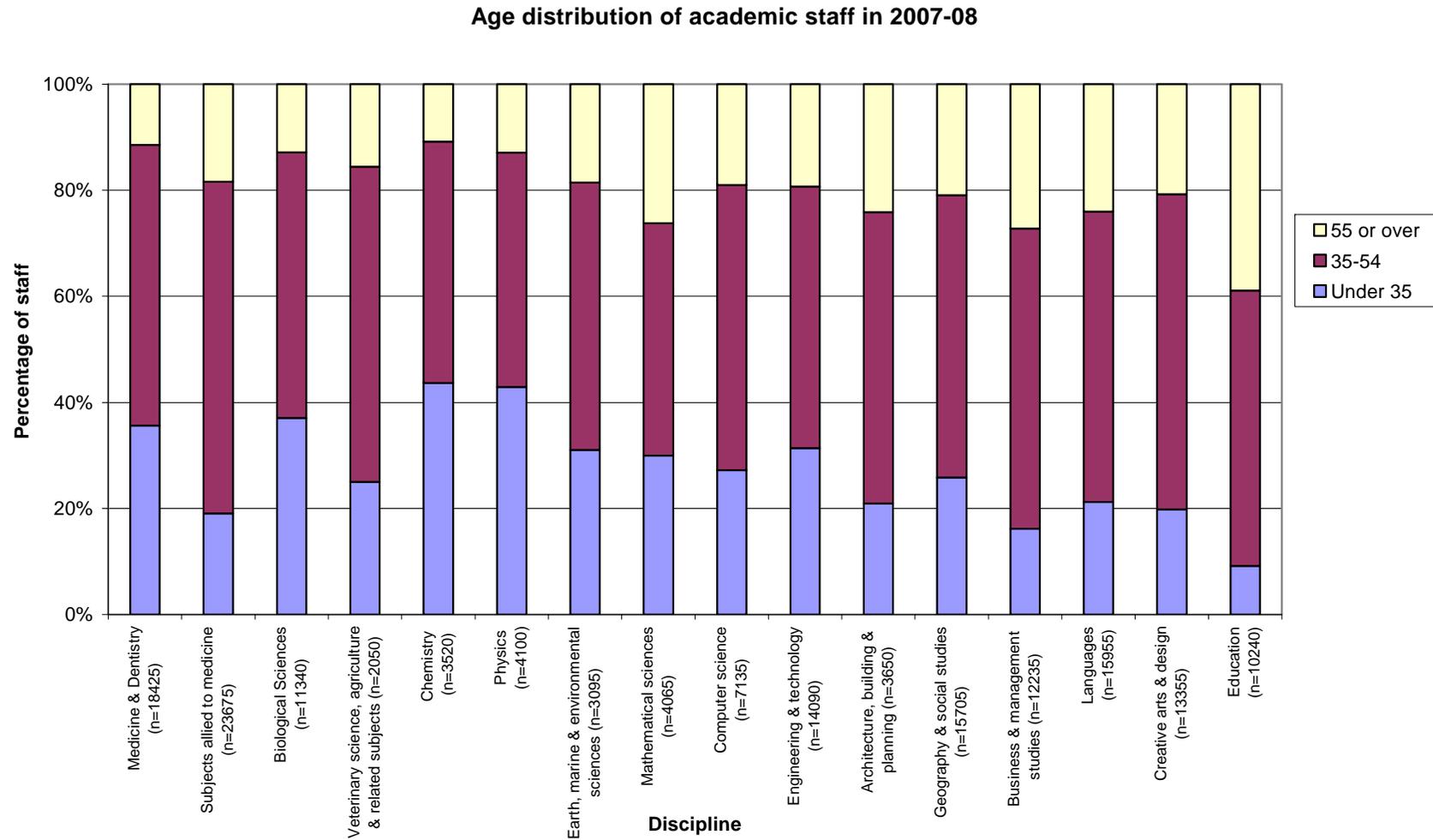
Chart 2

Percentage change in numbers (FTE) of academic staff between 2003/04 and 2007/08



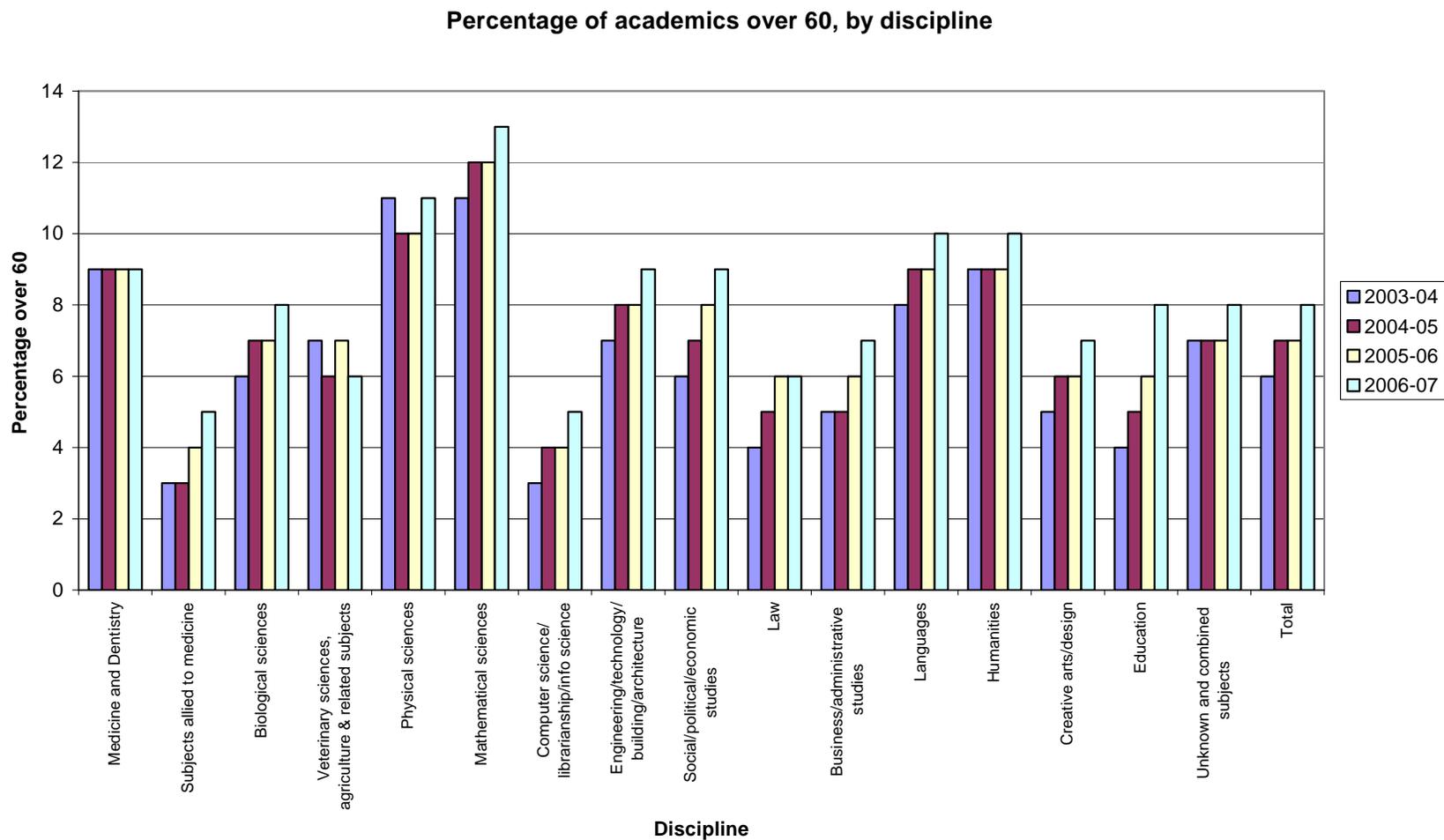
Compiled using data supplied to RCUK by HESA

Chart 3



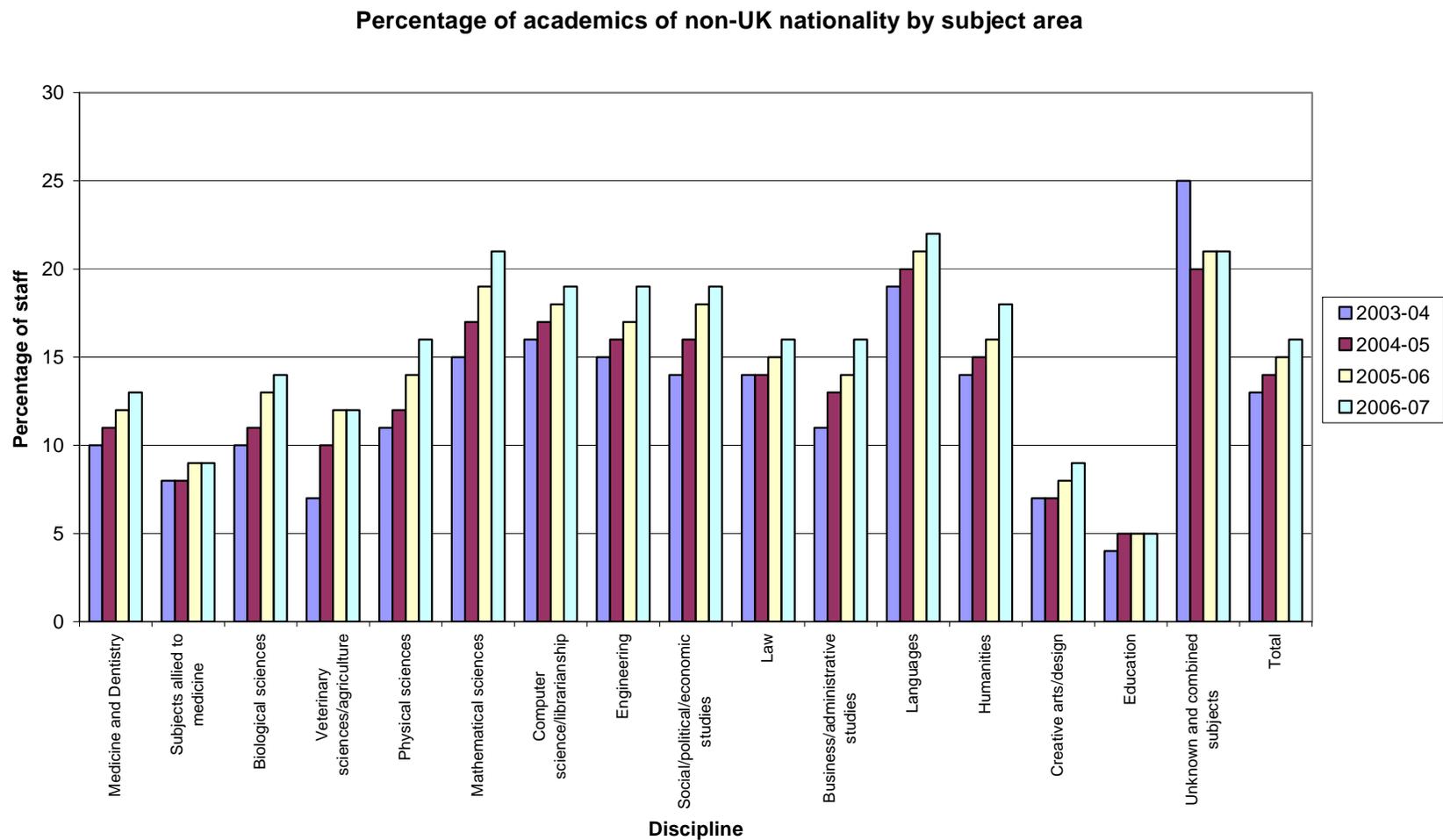
Data drawn from the HESA publication ‘Resources of Higher Education Institutions 2007/08’ (table 13, with reference to table 12 for actual figures to allow amalgamating percentages).

Chart 4



Data taken from table 22 of the HEFCE publication *Staff employed at HEFCE-funded HEIs update: trends and profiles (2008/26)*. The HEFCE analysis for this report showed that between 2003/04 and 2006/07, the change in proportion of academic staff aged over 50 was minimal, therefore they focussed on changes in the number of staff aged over 60.

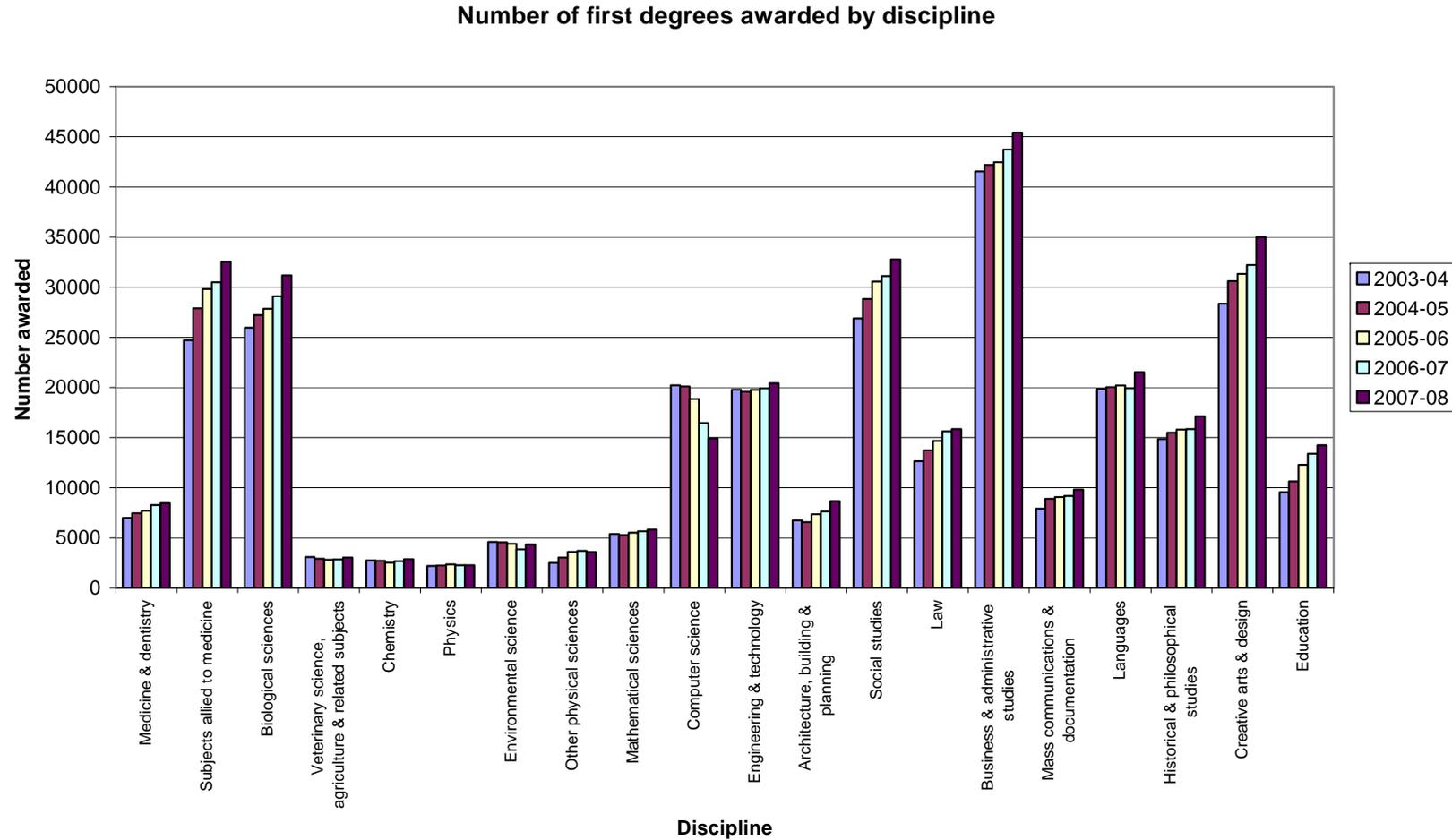
Chart 5



Data taken from table 42 of the HEFCE report 'Staff employed at HEFCE-funded HEIs: update' (2008/26).

Annex 1: Charts

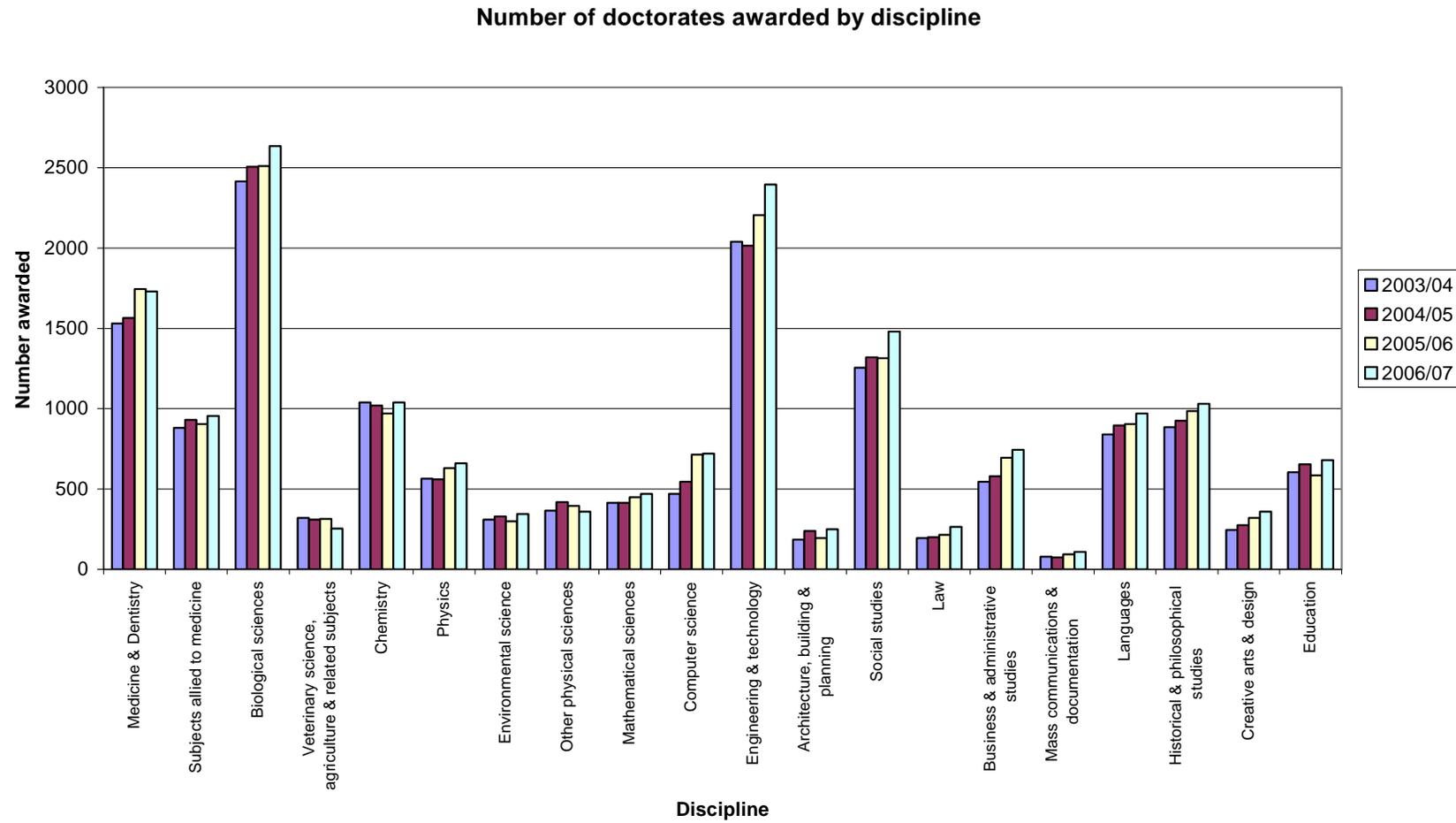
Chart 6



Data were taken from the Higher Education Statistics Agency (HESA) ‘Students in Higher Education’ annual publications, table 15c. ‘First degrees’ excludes other qualifications below degree level such as Foundation Degrees, diplomas, HNDs, HNCs, etc. See footnote 6 on p9 for comments on groupings of disciplines.

Annex 1: Charts

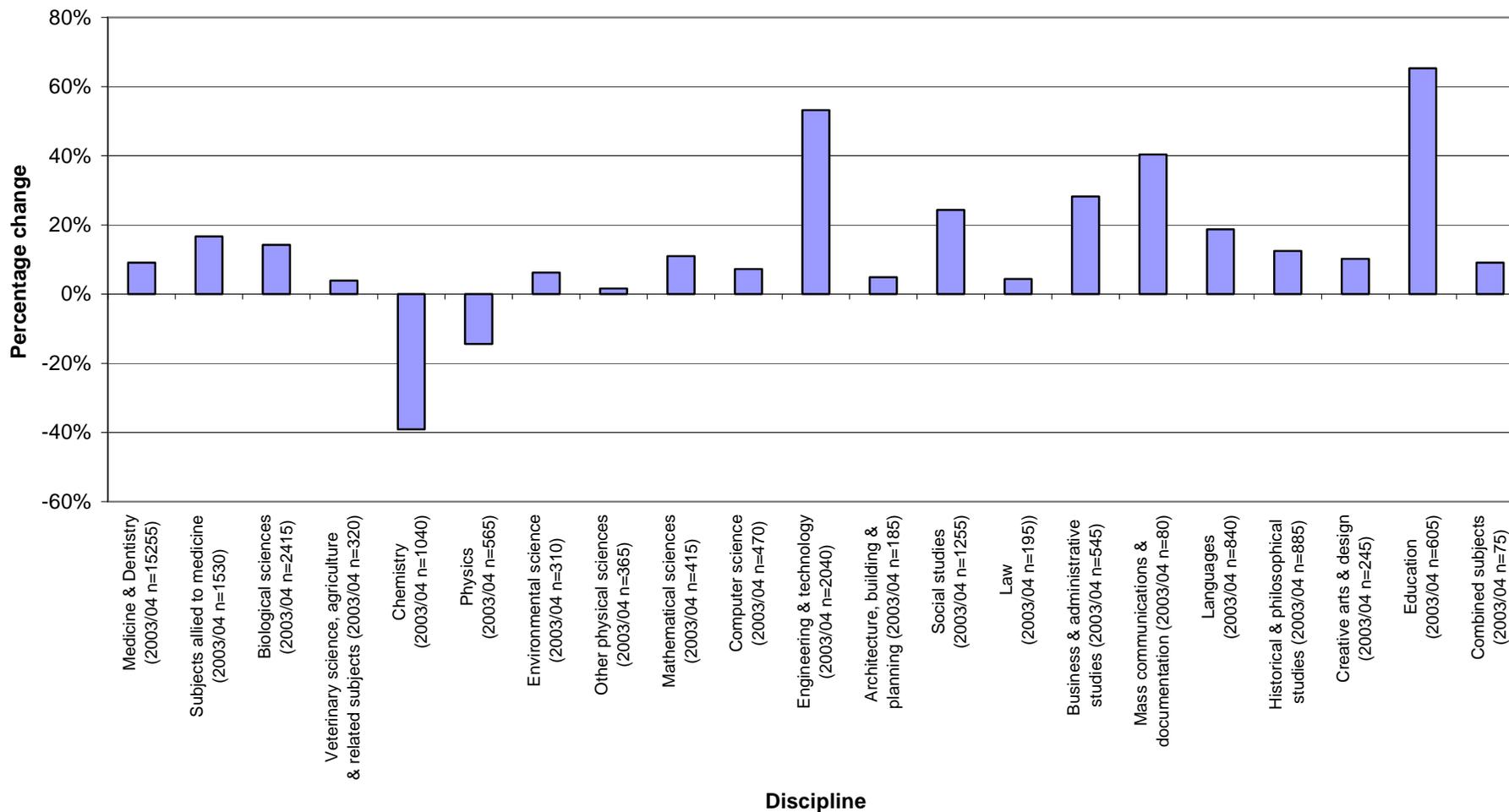
Chart 7



Data were taken from the Higher Education Statistics Agency (HESA) ‘Students in Higher Education’ annual publications, table 13a. See footnote 6 on p9 for comments on groupings of disciplines.

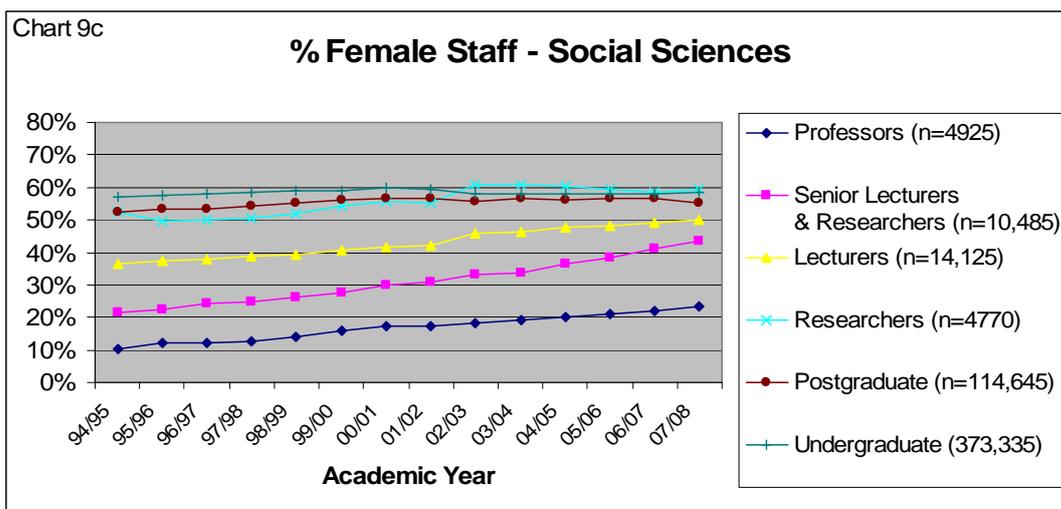
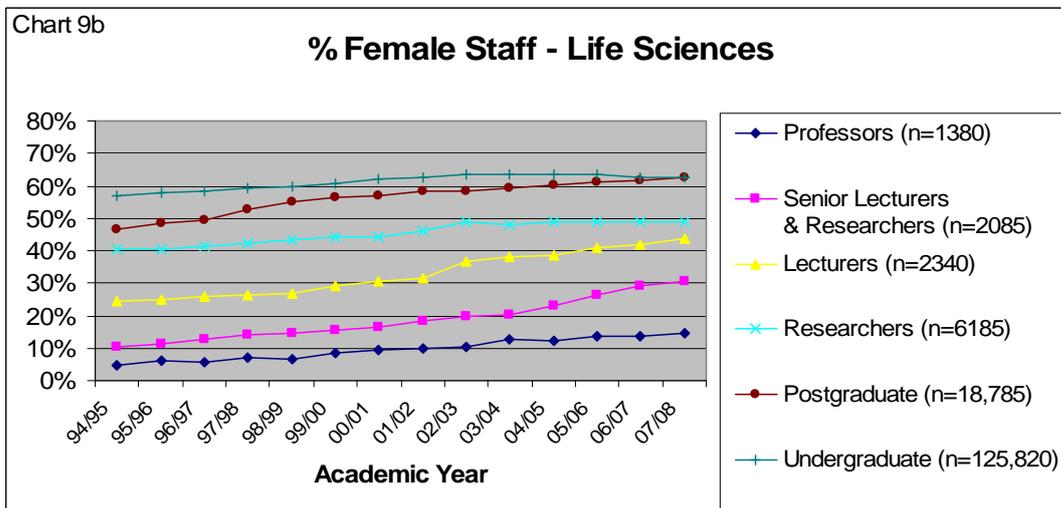
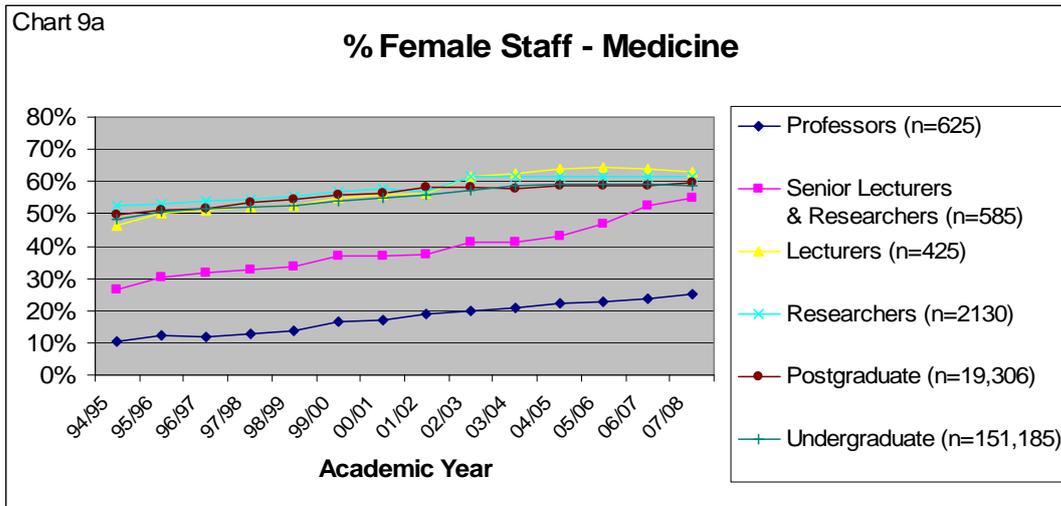
Chart 8

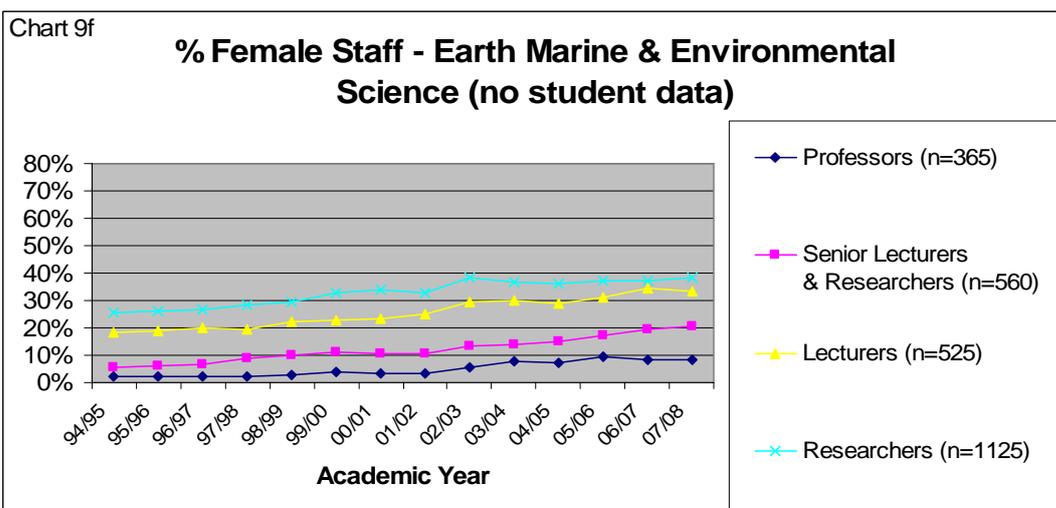
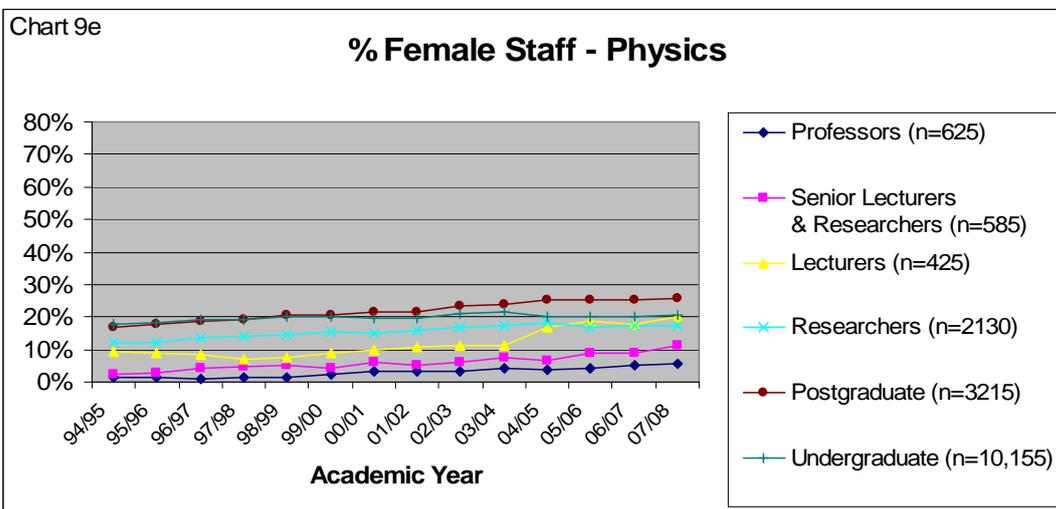
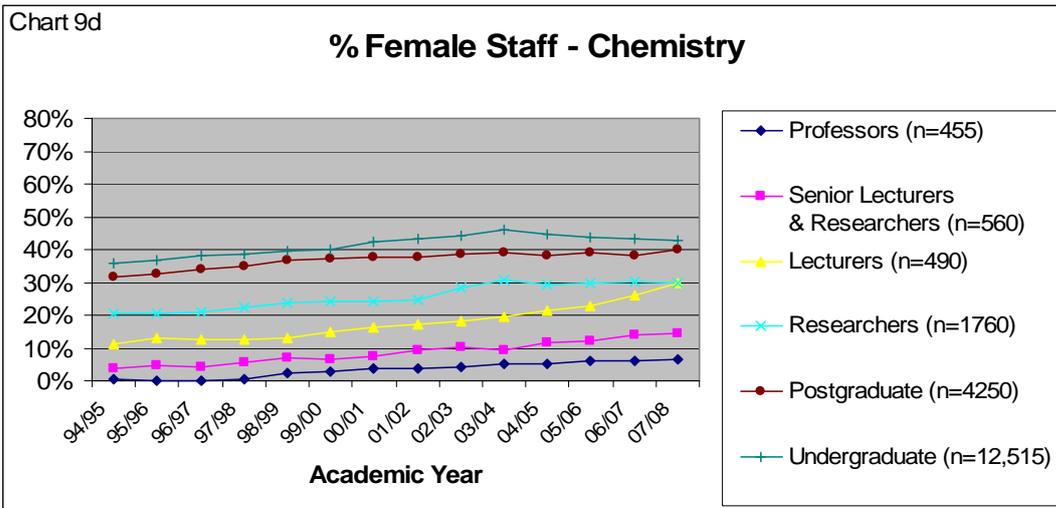
Percentage change in numbers of doctorates awarded between 2003/04 and 2006/07

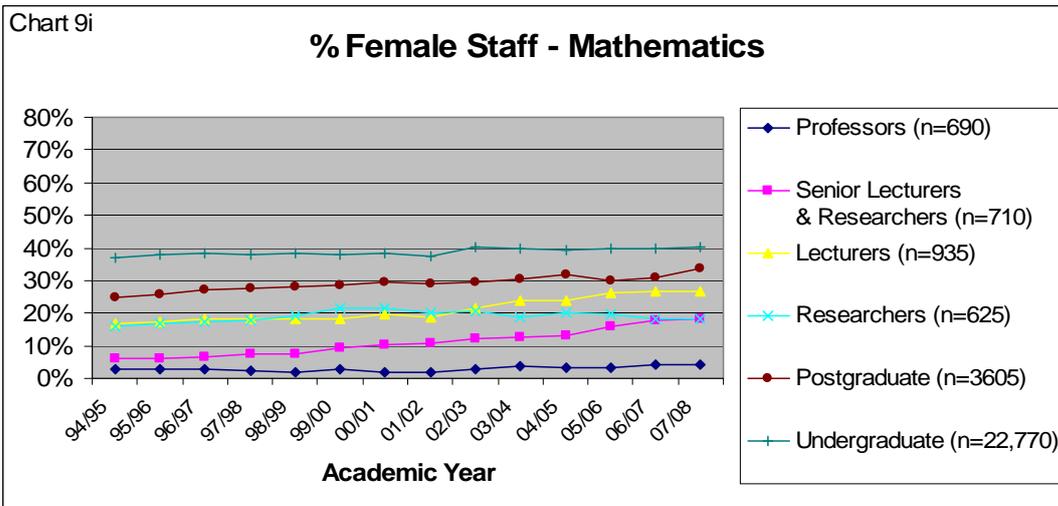
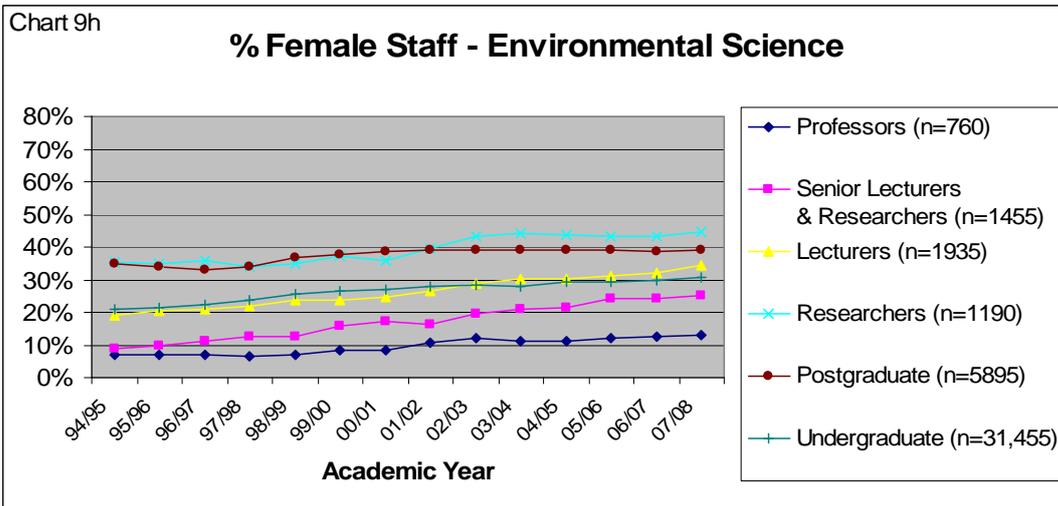
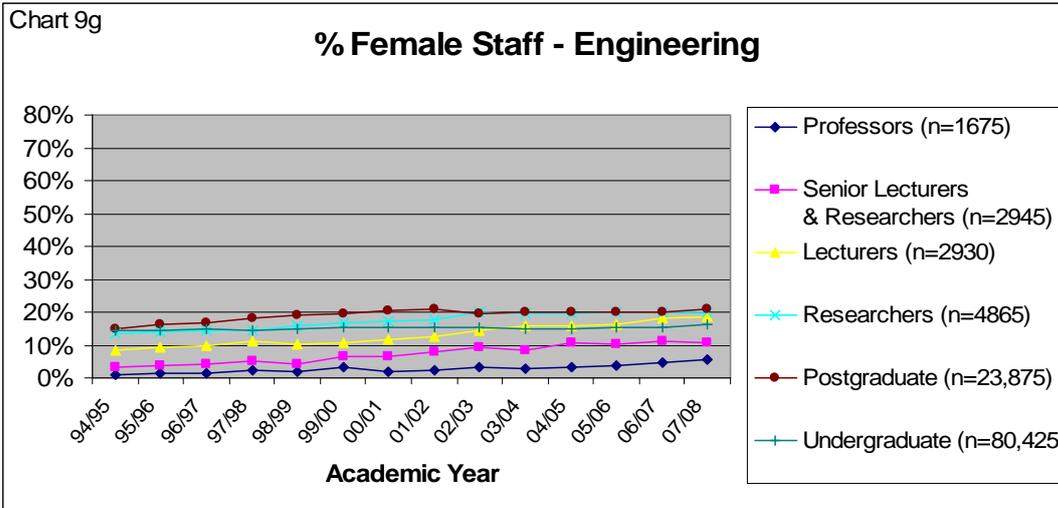


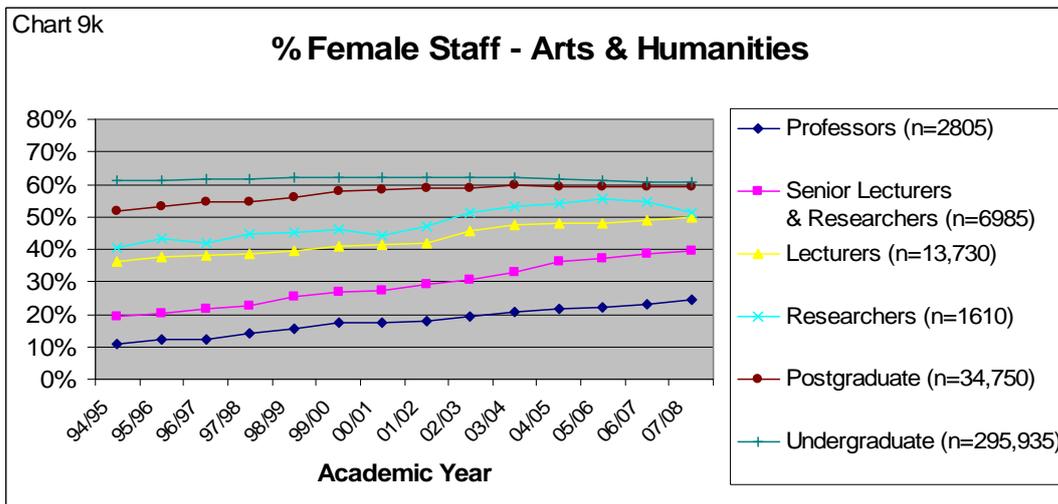
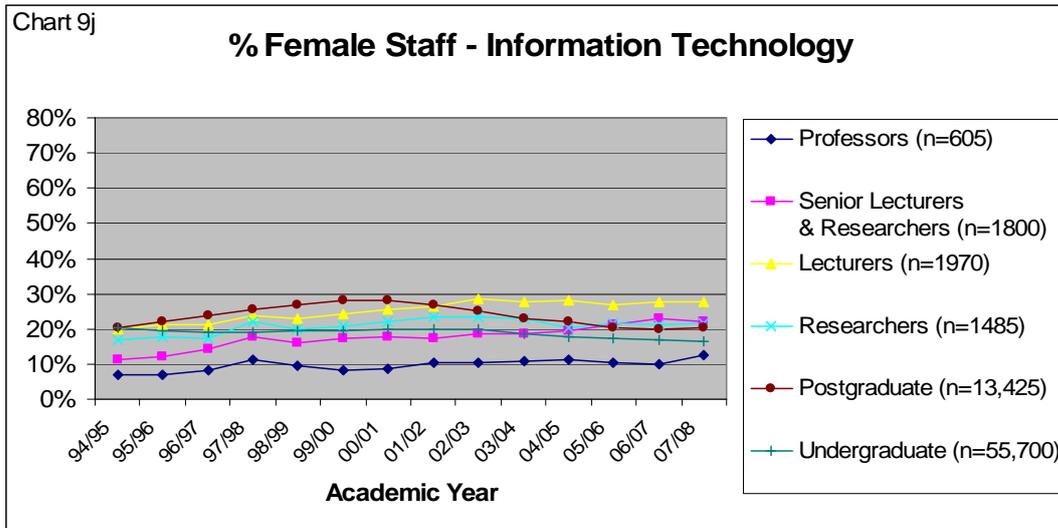
Data were taken from the Higher Education Statistics Agency (HESA) ‘Students in Higher Education’ annual publications, table 13a. See footnote 6 on p9 for comments on groupings of disciplines.

Annex 2: Gender of academic staff (Charts)









Data from HESA annual publication 'Resources of Higher Education Institutions'.
 n = total number (both male and female) at that career stage for the year 2007/08

Academic cost centres were amalgamated into subject areas for the Annex 2 Charts as follows:

Subject area:	HESA academic cost centres:
Medicine	Clinical medicine; Clinical dentistry; Anatomy & physiology; Nursing & paramedical studies; Health & community studies; Pharmacy; Pharmacology
Life sciences	Agriculture & forestry; Biosciences; Veterinary science
Social sciences	Business & management studies; Education; Psychology & behavioural sciences; Social studies; Sports science & leisure studies
Chemistry	Chemistry
Physics	Physics

Earth, marine &
environmental
science

Earth, marine & environmental sciences

Chemical engineering; Civil engineering; Electrical, electronic & computer
engineering; General engineering; Mechanical, aero & production
engineering; Mineral, metallurgy & materials engineering; Other technologies

Engineering
Environmental
science

Archaeology; Architecture, built environment & planning; Geography

Mathematics

Mathematics

Information

Technology

Computer software engineering; Information technology & systems sciences

Arts &

Design & creative arts; French, Spanish & German modern languages;

Humanities

Humanities; Language based studies; Librarianship, communication & media
studies; Other modern languages

BIBLIOGRAPHY

BIS (DIUS)

1. HE Debate Reports (October 2008)

To inform the development of the policy framework which will determine what a world-class higher education system of the future should look like, what it should seek to achieve, and will establish the current barriers to its development. The Secretary of State commissioned a set of independent contributions focusing on a number of broad higher education issues by several individuals and organisations from the higher education sector.

http://www.dius.gov.uk/higher_education/shape_and_structure/he_debate

International Issues in HE – Professor Bone
Academia and public policy making - CST
Understanding HE institutional performance – HEFCE
Part-time studies and HE – Professor King
Teaching and the student experience – Professor Ramsden
Research Careers – Professor Thrift
Demographic challenge facing our universities – UUK
Intellectual property and research benefits – Professor Wellings
World leader in e-learning – Sir Ron Cooke
Universities links with schools in STEM subjects – Professors Goodfellow and Coyne

The reports from Professors Thrift, Wellings and Bone are of particular relevance to this report.

2. The Demand for Science, Technology, Engineering and Mathematics (STEM) Skills (January 2009)

http://www.dius.gov.uk/~media/publications/D/Demand_for_STEM_Skills

The main findings of the report are:

- Evidence from employers shows that there are specific recruitment difficulties in some STEM-related sectors in so far as employers report insufficient UK candidates in particular areas of the biosciences, engineering and IT of the quality they are seeking. To some extent these difficulties relate to the lack of applicants with specific STEM knowledge and qualifications.
- However, to a greater extent, the recruitment difficulties expressed by employers are broader concerns about a lack of well rounded candidates with technical skills, broader competencies, such as mathematical capability, and practical work experience.
- The supply of STEM graduates and postgraduates has increased in recent years. Between 2002/3 and 2006/07,
 - The number of STEM first Degree qualifiers from UK HEIs (excluding the Open University) increased by 11%;
 - The number of STEM Other Undergraduate qualifiers increased by 24%;
 - The number of STEM Masters qualifiers increased by 35%; and
 - The number of STEM PhD qualifiers increased by 18%.
 - However, there are differences between STEM subjects and at different qualification levels. For example, first degree qualifiers in medicine and dentistry increased by 34% whereas for chemistry and computer science there were falls of 10% and 11% respectively.

3. World Class Skills: Implementing the Leitch Review of Skills in England (July 2007)
http://www.dius.gov.uk/reports_and_publications%20HIDDEN/leitch

In order to sustain and improve our position in the global economy, the Government has committed itself to the ambition of becoming a world leader in skills by 2020, benchmarked against the top quartile of OECD countries.

Treating employers and individual learners as the customers of the skills system is central to the idea of a demand-led approach. Through the measures set out in this plan, we will give employers the opportunity to exert real leverage and decision-making over both the content and delivery of skills and employment programmes. That will help us to build employer confidence in the qualifications and learning programmes provided by universities, colleges and training providers, and it will open the door to increased employer investment in skills. We will use employer satisfaction data to monitor whether the skills delivered contribute to improved business performance.

House of Commons Innovation, Universities, Science and Skills Committee

1. Re-skilling for recovery: After Leitch, implementing skills and training policies (December 2008)

<http://www.publications.parliament.uk/pa/cm200809/cmselect/cmdius/48/4802.htm>

The Review concludes that the economic climate makes it more imperative not less that skills levels are raised. As the UK comes out of recession, people will be needed who can pick up the new range of jobs which emerge at that time. An emphasis within skills policy on reskilling is therefore vital. We are also concerned that the current policy of supplying skills and expecting businesses to utilise them, rather than tackling skills shortages or approaching skills as part of a wider national economic development plan, will not hold up in a shrinking economy where the major drivers of the financial, business services and retail sector have stalled. The Government will have to consider how to build more flexibility into its support for training and also more direction to ensure that the UK concentrates its skills development in areas for which there is current and future demand.

The Council for Industry and Higher Education (CIHE) Reports

<http://www.cihe-uk.com/publications.php>

1. Developing Entrepreneurial Graduates: Putting entrepreneurship at the centre of higher education (September 2008)

A report launched by CIHE, NESTA and NCGE warns that unless universities embed entrepreneurship education in all parts of university life they risk losing out to fierce international competition.

2. Global Horizons and the Role of Employers (October 2008)

Global businesses are increasingly seeking graduates who have a global awareness. They value those who have the initiative to study overseas as part of their learning. Such study helps them be more culturally aware, more able to work in multicultural teams and more able to move around the world as part of their career. But UK graduates are missing out as they are now less likely to study overseas than they used to.

3. Global Horizons for UK Students (November 2007)

Offers guidance for universities on the issues they face as they internationalise with a range of examples on current good practice.

4. The Demand for STEM Graduates (January 2009)

New research jointly commissioned by CIHE with DIUS and the Engineering Technology Board (ETB) from the University of Warwick on benchmark projections about business requirements for STEM skills reveals that, based on past employment figures, demand for STEM graduates and postgraduates will grow significantly faster than the average for all subject groups.

5. Universities, Business and Knowledge Exchange (October 2008)

Extracts the lessons from case studies to show how and where value is most generated in the process of developing knowledge that has business application.

6. Workforce Development: how much engagement do employers have with higher education? (March 2007)

This report brings together the evidence on employer demand for higher level workforce development. As such it highlights the challenges faced by businesses and higher education in trying to meet the Leitch target of enhancing workforce skills.

Universities UK Reports

<http://www.universitiesuk.ac.uk/PUBLICATIONS/Pages/Default.aspx>

1. Patterns of Higher Education Institutions in the UK: 7th Report (September 2007)

The seventh report follows the established format of the Patterns series. Section A looks at macro-level trends over a 10-year period from 1996/97 to 2005/06 and provides the context for the findings about institutions. Section B looks at patterns of institutional diversity and updates information on higher education institutions provided in the earlier Patterns reports. Section C focuses on strategic subjects, which Universities UK's Longer Term Strategy Group has been looking at this year, and examines trends in a range of subjects that may be considered both strategically important and potentially vulnerable to changing patterns of student demand.

2. Patterns of Higher Education Institutions in the UK: 8th Report (September 2008)

The eighth report follows the established format of the Patterns series. Section A looks at sector-level trends over the 10-year period from 1997/98 to 2006/07 and provides the context for the findings about institutions. Section B looks at patterns of institutional diversity and updates information on higher education provided in the earlier Patterns reports. Section C focuses on some of the financial aspects of diversity and provides a time series analysis.

3. Patterns of Higher Education Institutions in the UK: 9th Report (September 2009)

The ninth report follows the established format of the Patterns series. Section A looks at sector level trends over the 10-year period from 1998/99 to 2007/08 and provides the context for the findings about institutions. Section B looks at patterns of institutional diversity and updates information on higher education provided in the earlier Patterns reports. Section C focuses on a range of statistical information about higher education in Europe, and the UK's relationship with this.

4. The future size and shape of the higher education sector in the UK: demographic projections (March 2008)

This first report analyses the demographic data on the age groups most relevant to the future demand for higher education. The analysis leads to a set of demand-based projections for the four countries of the UK for 2027. This report provides an initial analysis of what the key uncertainties and drivers might be for the different student markets that higher education institutions currently operate in.

5. The future size and shape of the higher education sector in the UK: threats and opportunities (July 2008)

This report takes forward the assessment of the future size and shape of the higher education sector in the UK in twenty years' time, building on the demographic projections in the first report on this study. It is not an attempt to forecast the future, but rather an attempt to provide

higher education institutions with some warning of the possible challenges that lie ahead through the development of scenarios that reflect possible futures for higher education so that they are well placed to anticipate those challenges.

6. Promoting the UK doctorate: opportunities and challenges (July 2009)

The report examines current provision and future challenges including the reputation and attractiveness of the UK doctorate, the structure and provision of doctoral programmes and the impact of doctoral programmes and doctoral graduates.

7. Monitoring research concentration and diversity: changes between 1994 and 2007 (June 2009)

This study reviews the extent of research concentration and diversity across six sample subject disciplines¹. Data and analyses for these disciplines suggest that over the 14 years from 1994 to 2007 research activity has become more concentrated in the most highly rated research units² (grades 5 and 5* based on the outcome of the Research Assessment Exercise (RAE) in 2001). Although these data have implications for research concentration by institution, they do not provide direct information on that issue.

8. Talent wars: the international market for academic staff (July 2007)

This policy briefing aims to raise awareness and understanding among policy-makers and UK higher institutions of the international dimensions of academic staff recruitment and the factors that may influence it. This briefing summarises recent research and considers its implications for institutions and for national policies.

9. The UK's Competitive Advantage: The Market for International Research Students (July 2008)

This policy briefing aims to raise awareness and understanding among policy-makers and UK higher institutions of the international dimensions of academic staff recruitment and the factors that may influence it. This briefing summarises recent research and considers its implications for institutions and for national policies.

HEFCE Reports

<http://www.hefce.ac.uk/pubs/>

1. Strategically Important and Vulnerable Subjects (SIVS): an interim evaluation of HEFCE's programme of support (July 2008)

This report provides an interim evaluation of the Higher Education Funding Council for England's (HEFCE's) programme of support for Strategically Important and Vulnerable Subjects (SIVS). It presents a brief historical overview of the types of intervention which have been and are being made. The projects within the programme are in general well thought through, are addressing the root causes which result in vulnerability, and are making satisfactory or good progress. Programmes are being delivered to a high standard by committed and competent staff. The interventions generally complement parallel interventions by other bodies, and the effectiveness of delivery has been enhanced through partnership working.

2. Strategically important and vulnerable subjects Final report of the 2008 advisory group (October 2008)

The advisory group supports HEFCE's £350 million programme of work to support vulnerable subjects and suggests the following principles in relation to strategically important subjects:

- a. The group concurs with the view of the previous Strategically Important and Vulnerable Subjects (SIVS) advisory group, in its 2005 report (HEFCE 2005/24), that it should be the Government's role at any given time to designate subjects as being strategically important, and HEFCE's role to consider whether such subjects are vulnerable and the interventions necessary to address this.

- b. The group supports the policy framework developed by the 2005 review, while emphasising the importance of skills in the workplace and the need for HEFCE to establish a framework for integrating its activities on SIVS and on employer engagement. The group also highlights the value of measures to address the supply of, as well as demand for, SIVS.
- c. HEFCE should adopt a selective approach to sustaining provision in specific places and any intervention should be characterised by innovation and collaboration, a strongly evidenced case for vulnerability and the enhancement of national provision as well as that in the specific locality.
- d. The group welcomes the progress of the key indicators of demand in STEM subjects and notes the continued impact on STEM demand of the growth of more vocational areas of science such as medicine and pharmacy.
- e. The group notes the sustained volume of modern languages provision in higher education and supports the measures recommended by Lord Dearing's Languages Review to develop languages at lower levels.
- f. In light of the Gill Review and the measures being taken by HEFCE to sustain specialist provision, land-based studies should no longer be considered vulnerable.
- g. The group supports HEFCE's programme of support for SIVS, and sees it as being appropriate and proportionate for the issues identified. Outcome and output measures should be in place and regularly monitored in any further funding provided
- h. A new advisory group should be set up with a remit to consider graduate supply and demand, and the range of health-of-discipline issues arising from indicators of vulnerability. Research should be undertaken into salaries and other measures of graduate demand, which will complement information produced by Sector Skills Councils and others.
- i. A further review of the SIVS policy framework should be carried out in 2011.

3. PhD study: trends and profiles, 1996-97 to 2004-05 (February 2009)

This report describes the characteristics of starters to doctoral degree courses in UK higher education institutions between 1996-97 and 2004-05. The attributes of both the student and the course are examined.

4. Staff employed at HEFCE-funded HEIs: update Trends and profiles 2007 December 2007)

This report is the fourth HEFCE report on staff employed at HEFCE-funded higher education institutions (HEIs) and builds on the findings reported in 2006 (see HEFCE 2006/31) by including information on staff in academic year 2005-06. This update provides information on staff employed in English HEIs, with further detail given by separating the staff into academic, professional and support staff.

5. Staff employed at HEFCE-funded HEIs: update Trends and profiles 2008 (July 2008)

This report is the fifth HEFCE report on staff employed at HEFCE-funded higher education institutions (HEIs) and builds on the findings reported in 2007 (see HEFCE 2007/36) by including information on staff in academic year 2006-07. This update provides information on staff employed in English HEIs, with further detail given by separating the staff into academic, professional and support staff.

HEFCW

1. First Annual Report on Research Staff

Covering the period 2003/4 to 2006/7

<http://www.dius.gov.uk/~media/publications/F/FundersForumResearch%20Staff2008>

The report was produced in response to the request from the UK Research base Funders' Forum in 2007 that the funding bodies should report annually on trends in research staff. It looks at researchers by contract type, subject area, turnover, Full time/part time, gender, age and salary.

Universities and Colleges Employers Association (UCEA)

1. Recruitment and Retention Report 2008

http://www.ucea.ac.uk/en/Publications/Recruitment_and_retention.cfm

This survey of recruitment and retention in higher education is the latest in a series conducted over the last 20 years. Staff turnover and recruitment and retention measures are important indicators of the attractiveness of higher education (HE) jobs and staff satisfaction within the sector.

Breast Cancer Campaign

1. Science for life – Why the UK needs to nurture its researchers or risk losing the saviours of tomorrow.

<http://www.breastcancercampaign.org/files/whatwedo/researchissues.pdf>

In 2006, Breast Cancer Campaign conducted a survey of 62 senior UK scientists working on projects funded by the charity to examine their views and experience of careers in medical research. The report concludes that to address the key issues for a career in medical research, BCC recommends:

- Higher status to be given to science and research
- Better career progression and job security for researcher
- Salaries which reflect the value of the contribution of medical research to society
- Well resourced research facilities

In order to maintain the UK's position as a key player in science and research; it also recommends:

- Improved access to funding and longer term grants
- Greater Government investment in cancer research
- Less bureaucracy
- More emphasis placed on the education and training of researchers

ARISE Advancing Research in Science and Engineering

1. Investing in Early-Career Scientists and High-Risk, High-Reward Research

<http://www.amacad.org/arisefolder/ariseReport.pdf>

The American Academy of Arts and Sciences assembled a committee of academic and business leaders to stimulate discussion of, and action on, two issues central to the nation's research efforts that have not received sufficient attention:

- Support for early-career faculty.
- Encouragement of high-risk, high-reward, potentially transformative research.

It focuses on Career Development, career paths and on government wide demographic data on applicants and PIs.

Equality Challenge Unit

1. Equality in Higher Education: Statistical Report 2008 (December 2008)

<http://www.ecu.ac.uk/publications/equality-in-he-stats-08>

This report, commissioned by ECU, presents a selection of statistics relating to the higher education sector in terms of gender, race, disability and age. It is drawn primarily from the 2006/07 Higher Education Statistics Agency (HESA) data set, and reflects issues identified by ECU as priorities in its 2007–10 strategy.

2. Equality in Higher Education: Statistical Report 2009 (October 2009)

<http://www.ecu.ac.uk/publications/equality-in-he-stats-09>

The 2009 report builds on last year's publication providing further analysis including combinations of equality characteristics, and includes data from the past five years to allow analysis of key trends over time. There are also find sections on pay gaps (for gender, ethnicity and disability), and a full breakdown of the higher education workforce by occupational group, grade and mode.

Royal Society

1. Hidden wealth: the contribution of science to service sector innovation (July 2009)

<http://royalsociety.org/document.asp?tip=0&id=8693>

The report highlights the wider significance of science, technology, engineering, and mathematics (STEM) to the services sector, which makes up around three quarters of the UK economy.

Hidden Wealth concludes that STEM is deeply embedded within the UK service sectors and has an extensive impact on service innovation processes, which is often hidden.

European Commission

1. Remuneration of Researchers in the Public and Private sectors (April 2007)

http://ec.europa.eu/euraxess/pdf/final_report.pdf

This study is one of the activities that the European Commission is performing in order to contribute to the creation of a more attractive Europe for researchers and young people entering a scientific career, the final aim of which is to become a more knowledge-based society.

The study collected information on the gross and net remunerations of researchers in the public and private commercial sectors. As such, it is the first attempt to gain insight into the profession of researchers. The study also discusses researchers' career recognition, which seems to have fallen behind compared to other professions.

Institute of Physics

1. Physics and the UK Economy (September 2007)

http://www.iop.org/activity/business/Business_and_Innovation_Policy/Publications/economy/file_26914.pdf

This report examines the contribution of physics to the UK and how the use of physics in the UK economy between 2000 and 2005 has changed. This research highlights the value generated by physics-based sectors¹ for the economic prosperity of the UK.

Vitae

1. What do researchers do? First destination of doctoral graduates by subject (June 2009)

2. **What do researchers do? Career profiles of doctoral graduates**

<http://www.vitae.ac.uk/policy-practice/107611/What-do-researchers-do-2009.html>

What do researchers do? First destinations of doctoral graduates by subject demonstrates that doctoral graduates continue to be highly employable across the economy in a wide range of occupations.

What do researchers do? Career profiles of doctoral graduates is a collection of 40 career profiles. These career stories provide insights into the paths that doctoral graduates take beyond their first destination.

Research Councils UK

1. **RCUK Review of UK Physics (October 2008)**

<http://www.rcuk.ac.uk/review/physics/default.htm>

The purpose of the review is to specifically examine the health of the entire discipline of physics, and the priorities and challenges facing the discipline in the medium to long-term future. It is understood that the review was commissioned at a time of considerable concern among a part of the community about funding decisions, but understanding how those concerns arose and the decision processes have not directly been a part of the review's remit.

The Panel has noted that despite levelling off recently, physics A-level numbers have declined over the past fifteen years and, compared with other sciences, physics has a significantly lower number of female entrants – a trend that is replicated throughout the academic system.

2. **2009 International Review of UK Chemistry Research – Report (June 2009)**

<http://www.epsrc.ac.uk/AboutEPSRC/IntRevs/2009ChemistryIR/default.htm>

The 2009 Chemistry International Review Panel completed a week long review of chemistry research throughout the United Kingdom. Although sponsored by the EPSRC the Panel was charged to include the whole chemistry research base that is funded by the Research Councils, charities and industry. The Panel made a point of engaging early career research (ECR) scientists.

The review found pockets of excellent multidisciplinary research being nucleated via Doctoral Training Centres (DTCs). The panel was impressed with the calibre and intellectual strength of some of the ECR scientists they met. However, the general situation for some of the ECRs gives cause for concern. Another concern was the degree of communication and engagement of the chemistry community in both implementing policy and dialogue with decision makers.