

# **The Demographics and Research Interests of the UK Astronomy and Geophysics Communities 2010**

**Final Report**

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**A report for the Royal Astronomical Society  
by  
Sean McWhinnie  
Oxford Research & Policy**

For further information about the report, please contact:

Robert Massey  
Royal Astronomical Society  
Burlington House  
Piccadilly  
London W1J 0BQ  
UK

Tel: +44 20 7734 4582/3307

Email: [rm@ras.org.uk](mailto:rm@ras.org.uk)

Web: [www.ras.org.uk](http://www.ras.org.uk)

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## Executive Summary

Questionnaires were distributed to university departments and research establishments to collect data about the staff and research students engaged in astronomy, solar system science, and solid earth geophysics research. 41 university departments/research groups and 4 research establishments returned the questionnaire. Data for a further 27 university departments and one other research establishment were taken from their websites.

A second questionnaire, designed to collect detailed information about how individuals spend their time and what their research interests are, as well as demographic information, was made available to departments and research establishments as a link to the survey website. The link was also publicised by the Royal Astronomical Society and by the Science and Technology Facilities Council (STFC).

Results from the departmental/research establishment questionnaires and web research show that:

- Astronomy is the most populous research area with 1076 staff, followed by solar system science with 264, and solid earth geophysics with 243. 167 staff were recorded as working in cross-disciplinary areas.
- Among academic staff there is a relatively high proportion of professors in all research areas (47% of astronomy staff in universities on academic grades are professors, 39% of staff in solar system science, 47% of staff in solid earth geophysics, and 56% of staff in cross disciplinary areas) and comparison with data from 1998 suggests that the number of professors has more than doubled.
- The number of fixed-term researchers in universities has continued to rise. The 1993 survey recorded 323 fixed-term researchers and this has risen to 473 in 2010.
- The total number of technical staff in universities has fallen from around 210 in 1998 to 140 in 2010.
- In astronomy 7% of professors are female and 27% of lecturers, in solar system science 13% of professors and 26% of lecturers are female, and in geophysics 8% of professors and 32% of lecturers are female. Comparison with earlier years' data shows that in common with all subjects the proportion of women is rising at all levels but there is significant "leakage" of women in moving from junior to senior grades. Although astronomy appears to attract a higher proportion of women than physics, a major barrier to change remains the fact that only around 20% of A level physics entrants are female.
- In astronomy and solar system science the medium age for fixed-term staff is 30-34 years, and for permanent staff 40-44 years. The overall profile still looks relatively healthy with the supply of potential new staff being more than enough to cover retiring staff over the next few years. The proportion of female staff falls with age.
- The numbers of research students were 869 in astronomy, 152 in solar system science and 169 in solid earth geophysics. 38 research students were recorded as working in

cross-disciplinary areas. 70% of research students are full-time and domiciled (permanently resident) in the UK and just 3% of students are studying part-time. The proportion of women is 32% among UK-domiciled students and 39% among non-UK domiciled. The data suggest that the majority of students complete their studies within 4 years, and that the majority of students work on into a fourth year.

- The total full-time equivalent sizes of the respective communities are 1689 in astronomy, 371.2 in solar system science, 357.2 in solid earth geophysics. The equivalent of 203.8 members of the community have cross disciplinary interests. Comparison with 1993 and 1998 suggests that the size of the combined astronomy and solar system science communities has increased but this may partly be because research students are now funded for 3.5 years on average rather than 3 years.
- 86% of fixed-term researchers in astronomy and geophysics who left their roles, and for whom destinations are known, moved on to new roles within academia or research institutes.

902 respondents completed the on-line questionnaire. Key results drawn from the data are:

- Among permanent staff 78% are British, 12% are from other European countries, 2% are from the USA, and 7% are from other countries. 95% of permanent staff specified their ethnicity as White. Considering only British respondents, 97% are White. Results from the 2001 UK census showed that 92.1% of the population were white, so black and minority ethnic groups are under-represented
- All grades of academic staff spend between 35% and 39% of their time on research activities. Lecturers, senior lecturers and readers spend more time on undergraduate teaching (about 30%) than professors (19%), but all staff spend around 9% on postgraduate teaching. The proportion of time spent on administration and on external professional activities increases with seniority. Staff spend about 5% of their time on public engagement and outreach.
- Outside universities, research staff spend 46% of their time on research, 2% on undergraduate teaching, 8% on postgraduate teaching and 14% on administration. This group also indicates that 22% of their time is spent on other activities which include routine observations and instrument development and management.
- 64% of permanent staff indicated that they have research interests in an *Astronomy* research area with 60% of the whole sample indicating an interest in *Astronomy and/or Astrophysics* and 9% indicating an interest in *Particle Astrophysics*, 29% indicated an interest in some aspects of *Solar System Science*, and 15% indicated an interest in *Geophysics*.
- 61% of postdoctoral research associates are British, and, of these, 97% of those who indicated their ethnicity are White. 25% of the sample are of other European Union nationalities and, like the British sample, 96% of those who indicated their ethnicity are

White. Only 10% of the sample indicated that they hold citizenship from outside the European Union or the United States.

- On average postdoctoral research associates spend 82% of their time on research activities which is more than double the proportion of time spent by permanent academic staff.
- 68% of postgraduate research students are British, 16% are from elsewhere in the European Union, and 2% are from the USA. The majority of British students (66%) receive funding from the STFC and another 11% receive funding from NERC and 11% from the university or department. 40% of non-British students are supported by their host university and/or department, and 19% by research councils. 12% of all students indicated that have "other" sources of funding.
- Combining the data for permanent staff and postdoctoral research associates allowed us to assess the proportion of total effort expended on each general research activity. This shows that 32% of effort is expended on *Theory and numerical modelling* and 35% on *Data analysis*, 11% on *Observation/Data Collection*, 12% on *Data reduction*, and 7% on *Instrumentation*, 2% on *Facility operation and maintenance* and 2% on *Other* activities. Activities are split 54%, 34% and 13% between *Ground-based*, *Space* and *Other* areas respectively.
- The astronomy community makes the greatest use of facilities at optical wavelengths, followed by facilities operating in the infra-red and radio. There has been relatively little change in the proportions of effort between 1998 and 2010 except at X-ray wavelengths where the proportion of effort has fallen from 20% to 10% and at IR wavelengths where the proportion of effort has increased from 17% to 24%.
- Within *Astronomy* the most popular specific research areas were *Galaxies/Extragalactic*, *Stars* and *Cosmology and Radio, sub millimetre, infrared sources or background*. Within *Solar System Science* the most popular research areas were *Magnetosphere(s)*, *Plasma physics (including space, solar, astrophysical and laboratory)*, and *Solar Studies*. Within *Solid Earth Geophysics* the most popular research areas are *Earth Structure*, *Seismology* and *Tectonophysics*.

## **Acknowledgement**

I would like to thank all those who took the time to provide information about staff and research students in their departments and research establishments. I would also like to thank all those individuals who completed the on-line questionnaire.

In particular, I would like to thank those staff and members of the Royal Astronomical Society who helped and advised with this project. In particular I would like to thank Fern Storey, Robert Massey and Helen Walker.

Sean McWhinnie

## 1. Background

This report presents the results of a study of the Demographics and Research Interests of the UK Astronomy and Geophysics Communities carried out over the Autumn of 2010 and the first two months of 2011.

This study follows surveys carried out in 1988<sup>1</sup>, 1993<sup>2</sup>, 1998<sup>3</sup> and 2003. Results of the 2003 survey were not published.

The current study comprised two parts. In the first part departmental/group/institution heads were asked to complete a breakdown of staff working in astronomy, solar system science, and/or solid earth geophysics by grade, gender, age and broad research area. Heads were also asked about staff leavers and joiners in the last 5 years, and about the numbers of PhD students in their departments. The second part of the study collected data directly from individuals using an electronic web-based questionnaire. The questionnaire collected demographic details and asked for details of the research interests of individuals and how they divided their time between different aspects of their roles and between different research activities. Postdoctoral researchers and research students were also asked a number of questions about their career intentions. The analysis of these latter data will be presented in a separate report.

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<sup>1</sup> A. Wilkinson, Quarterly Journal of the RAS, 1990, 31, 411-455.

<sup>2</sup> A. Wilkinson, Quarterly Journal of the RAS, 1996, 37, 769-817.

<sup>3</sup> C. Tadhunter, Astronomy & Astrophysics, Journal of the RAS, 2000, 41, 2.19-22

## 2. Methodology

A questionnaire was distributed to university departments and research establishments to collect data about the staff and research students engaged in astronomy, solar system science, and solid earth geophysics research (Appendix C). The questionnaire was a simplified version of that used in previous studies and was designed to find the grades, gender and age of staff, and details of those staff who had joined or left in the last 5 years. The questionnaire also collected data about the current cohort of research students.

The questionnaire was distributed by email to university departments and research establishments believed to have some research activity in the areas of interest. The list of departments and establishments was constructed by drawing together lists of departments contacted to participate in previous studies, by consulting the Science and Technology Facilities Council (STFC) list of grants in astronomy, and by carrying out research on the internet. The full list of departments and research establishments that returned the questionnaire is presented in Appendix B. Where departments believed to have research of interest did not return the questionnaire, their websites were consulted and data on the numbers of staff at particular grades and research students working in the broad research areas of interest were collected (Appendix B).

A second questionnaire was to be completed by individuals (Appendix D). The questionnaire was designed to collect detailed information about how individuals spend their time and what their research interests are, as well as demographic information. Postdoctoral researchers and research students were also questioned about their motivations and career intentions.

The questionnaire was made available to departments and research establishments as a link to the survey website. In addition the link was publicised by the Royal Astronomical Society and by the STFC.

It is not known whether all the departments and research establishments approached distributed the link to the survey. In the case of two larger departments which had particularly low response rates, the link was also emailed directly to departmental members by the Royal Astronomical Society.

### **3. Results from the departmental and research establishment questionnaires**

It is difficult to make direct comparisons with the most recent published data from 1998 because the structure of the survey has changed. Although a survey was run in 2003, the raw data were not available so it is not possible to know whether a similar set of universities and research establishments was polled.

41 university departments/research groups and 4 research establishments returned the questionnaire. Data for a further 27 university departments and one other research establishment were taken from their websites.

#### **3.1 Staff numbers**

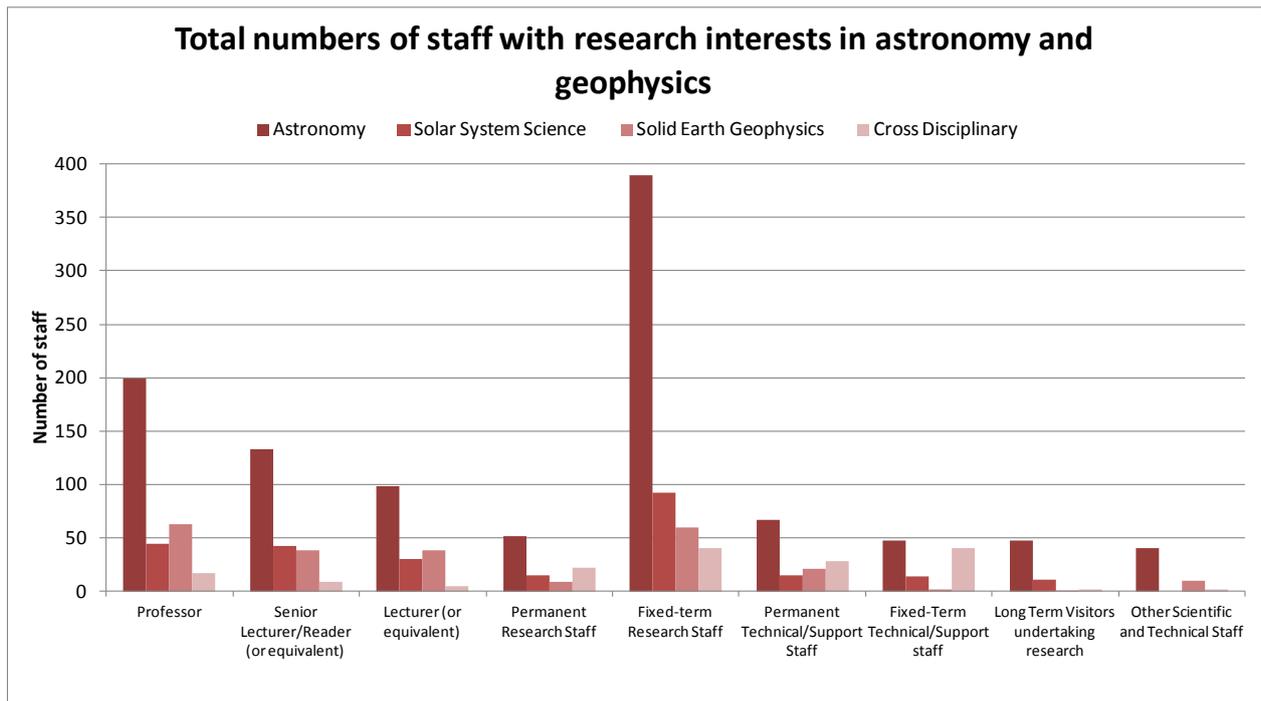
Table 1 shows the numbers of staff working in the broad research areas under consideration, and staff working in cross disciplinary areas. The same data are presented in Figure 1.

Astronomy is the most populous research area with 1076 staff, followed by solar system science with 264, and solid earth geophysics with 243. 167 staff were recorded as working in cross-disciplinary areas.

The greatest proportion of staff in all research areas are fixed-term researchers<sup>4</sup>, the majority of whom will be postdoctoral researchers. In universities, 38% of staff are fixed-term researchers in astronomy, 38% are in solar system science, 27% in solid earth geophysics, and 25% are in cross disciplinary areas.

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<sup>4</sup> Throughout section 3 it is assumed that the majority of fixed-term researchers are postdoctoral research associates.



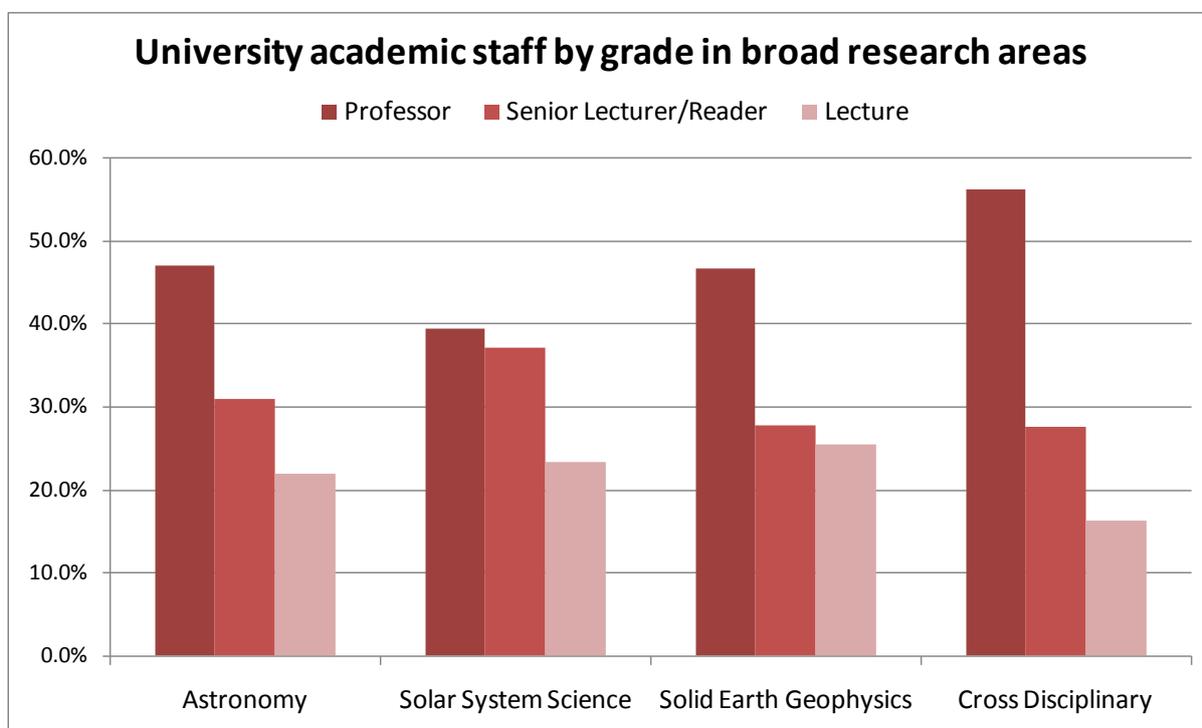
**Figure 1:** Total number of staff in post with research interests in Astronomy, Solar System Science and/or Solid Earth Geophysics

**Table 1:** Numbers (and proportions) of staff working in universities and research establishments with research interests in Astronomy, Solar System Science and/or Solid Earth Geophysics

Position	Broad Research Area											
	Astronomy			Solar System Science			Solid Earth Geophysics			Cross Disciplinary		
	U	RE	Total	U	RE	Total	U	RE	Total	U	RE	Total
Professor	193 (19.1%)	6 (9.1%)	199 (18.5%)	38.7 (16.0%)	6 (26.1%)	44.7 (16.9%)	62 (28.0%)	1 (4.5%)	63 (25.9%)	17.3 (10.4%)	0	17.3 (10.4%)
Senior Lecturer/Reader (or equivalent)	129 (12.8%)	4 (6.1%)	133 (12.4%)	36.5 (15.1%)	6 (26.1%)	42.5 (16.1%)	37 (16.7%)	2 (9.1%)	39 (16.0%)	8.5 (5.1%)	0	8.5 (5.1%)
Lecturer (or equivalent)	94 (9.3%)	5 (7.6%)	99 (9.2%)	23 (9.5%)	7 (30.4%)	30 (11.4%)	34 (15.4%)	4 (18.2%)	38 (15.6%)	5 (3.0%)	0	5 (3.0%)
Permanent Research Staff	37 (3.7%)	15 (22.7%)	52 (4.8%)	14 (5.8%)	1 (4.3%)	15 (5.7%)	6 (2.7%)	3 (13.6%)	9 (3.7%)	22 (13.2%)	0	22 (13.2%)
Fixed-term Research Staff	382 (37.8%)	7 (10.6%)	389 (36.2%)	91 (37.7%)	1 (4.3%)	92 (34.8%)	60 (27.1%)	0 (0.0%)	60 (24.7%)	41 (24.6%)	0	41 (24.6%)
Permanent Technical/Support Staff	63 (6.2%)	4 (6.1%)	67 (6.2%)	13 (5.4%)	2 (8.7%)	15 (5.7%)	9.2 (4.2%)	12 (54.5%)	21.2 (8.7%)	28 (16.8%)	0	28 (16.8%)
Fixed-Term Technical/Support staff	48 (4.8%)	0 (0.0%)	48 (4.5%)	14 (5.8%)	0 (0.0%)	14 (5.3%)	2 (0.9%)	0 (0.0%)	2 (0.8%)	41 (24.6%)	0	41 (24.6%)
Long Term Visitors undertaking research	48 (4.8%)	0 (0.0%)	48 (4.5%)	11 (4.6%)	0 (0.0%)	11 (4.2%)	1 (0.5%)	0 (0.0%)	1 (0.4%)	2 (1.2%)	0	2 (1.2%)
Other Scientific and Technical Staff	16 (1.6%)	25 (37.9%)	41 (3.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	10 (4.5%)	0 (0.0%)	10 (4.1%)	2 (1.2%)	0	2 (1.2%)
<b>Total staff</b>	<b>1010 (100%)</b>	<b>66 (100%)</b>	<b>1076 (100%)</b>	<b>241.2 (100%)</b>	<b>23 (100%)</b>	<b>264.2 (100%)</b>	<b>221.2 (100%)</b>	<b>22 (100%)</b>	<b>243.2 (100%)</b>	<b>166.8 (100%)</b>	<b>0</b>	<b>166.8 (100%)</b>

U - Universities, RE - Research Establishments

Consideration of the traditional academic grades of staff (professors, senior lecturers/readers, and lecturers) shows that there is a relatively high proportion of professors in all research areas (47% of astronomy staff in universities on academic grades are professors, 39% of staff in solar system science, 47% of staff in solid earth geophysics, and 56% of staff in cross disciplinary areas). On average these figures are higher than the proportion of professors in the physics cost centre which according to Higher Education Statistics Agency (HESA) data was 39% in 2007/08.<sup>5</sup> (The figures for physics include a proportion of astronomy staff). It should be noted that physics had the highest proportion of professors among the cost centres in the HESA data: the proportion of professors across all cost centres is 16%. The proportions of senior lecturers/readers and lecturers in physics were 35% and 26% respective which in turn are lower than the figures in this study.



**Figure 2:** Proportion of academic staff at each grade in universities in each broad research area.

Another benchmark is the ratio of research staff to academic staff. The values for astronomy, solar system science, solid earth geophysics are 0.89, 1.08 and 0.45 respectively (considering staff based in universities only); the value for physics in 2007/08 was 1.30; only one subject had a higher ratio than physics in 2007/08, clinical medicine at 1.34. The ratio for physical sciences overall is 1.09. The data suggest that astronomy and geophysics

<sup>5</sup> HESA Staff Data 2007/08

academic staff employ fewer postdoctoral researchers than physics academics do overall, although the numbers are in line with physical sciences<sup>6</sup> overall.

Table 2 presents data drawn from the 1998 and 1993 studies, together with equivalent data from the current survey, generated by combining the data for astronomy and solar system science. Although the data are not directly comparable some trends are clear. The number of professors has risen significantly: the data suggest that the number of university professors in astronomy and solar system science has more than doubled. The number of readers and senior lecturers has also significantly risen, but the number of lecturers has remained about the same. Overall there has been a significant rise in the number of permanent academic staff with research interests in astronomy and solar system science from 292 in 1993, through 312 in 1998 to 514 in 2010.

The number of fixed-term researchers in universities has continued to rise although the rise between 1993 and 1998 was greater than that between 1998 and 2010. The 1993 survey recorded 323 fixed-term researchers and this has risen to 473 in 2010. The ratio of academic staff to postdoctoral researchers in astronomy has fallen from 1.32 in 1998 to 1.09 in 2010.

The number of technical staff has fallen. Between 1993 and 1998 the balance between permanent and fixed-term technical staff had shifted in favour of fixed-term staff, although the total has remained about the same. Since 1998 the total number of technical staff in universities has fallen from around 210 to 140, although the number of permanent technical staff has remained around the same between 1998 and 2010, having fallen between 1993 and 1998.

Data for the research establishments are not directly comparable given that the number of establishments included in the earlier survey is twice that included in the 2010 survey.

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<sup>6</sup> Physical sciences includes chemistry, materials science, physics, archaeology as a physical Science, astronomy, geology, oceanography, geography studies as a science and, environmental science and other physical sciences.

**Table 2:** Staff in astronomy and solar system science in 1993, 1998 and 2010\*

Job Type	Number of staff		
	1993	1998	2010
<b>Permanent Academic Staff</b>			
Professors	77.5	98	231.7
Senior lecturers/Readers	99.5	97	165.5
Lecturers	114.7	117	117
Permanent research	39.5	20	51
Fixed-term (postdoctoral) researchers	322.7	412	473
Permanent technical	128.6	77	76
Fixed-term technical	106.7	137	62
Other	18.8	16	16
Total	908	974	1192.2
<b>Staff in (PPARC/STFC) establishments**</b>			
Permanent scientific	246	89	75
Permanent Technical	109	201	6
Fixed-term scientific	28	55	8
Fixed-term technical	11	64	0
Total	394	409	89

\* The figures presented for 1993 and 1998 are astronomy and Earth observation/atmospheric science combined. Data have been combined as appropriate to enable the earlier data to be comparable with 2010 data.

\*\* Data for 10 research establishments are included in 1993 and 1998 figures. Data for 5 establishments are included in the 2010 figures.

### 3.2 Proportion of female staff

Table 3 and Figure 3 show the proportions of female staff at each grade in each broad research area. Data for "Long Term Visitors undertaking research" and "Other Scientific and Technical Staff" and that for cross-disciplinary areas are not presented as the numbers are too small to allow a meaningful analysis.

The proportion of female staff varies by research grade, and between the research areas within each grade. In line with other university subjects, among the permanent academic grades, the proportion of women decreases with seniority.

In astronomy 7% of professors and 27% of lecturers are female, in solar system science 13% of professors and 27% of lecturers are female, and in geophysics 8% of professors and 32% of lecturers are female.

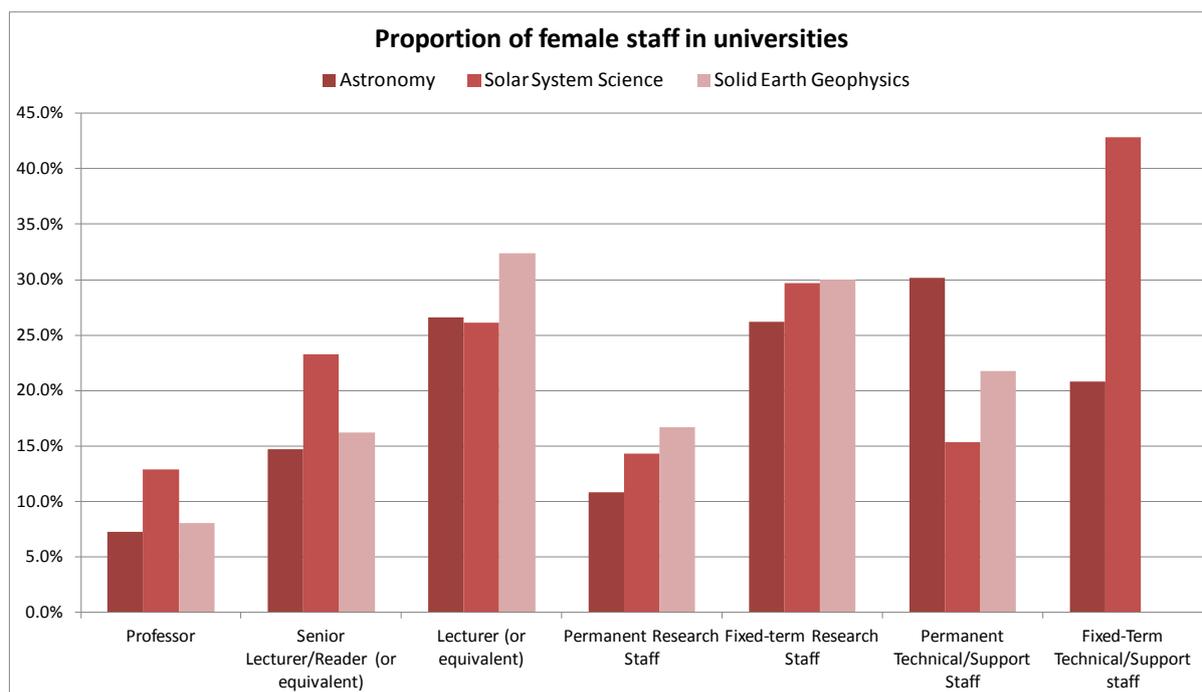
It is interesting to note that the proportions of female staff working as fixed-term researchers is higher than that working as permanent researchers, although again this is in line with other subjects. For example, in maths 22% of researchers are female, compared to 27% of lecturers, 20% of senior lecturers and 5% professors, and in biology 48% of

researchers are female, compared to 49% of lecturers, 36% of senior lecturers and 18% professors.<sup>7</sup>

**Table 3:** Proportion of female staff in universities at each grade by broad research area

Grade	Proportion of female staff by grade in each research area			
	Astronomy	Solar System Science	Solid Earth Geophysics	Physics*
Professor	7.3%	12.9%	8.1%	5.4%
Senior Lecturer/ Reader	14.7%	23.3%	16.2%	11.2%
Lecturer	26.6%	26.1%	32.4%	19.8%
Permanent Research Staff	10.8%	14.3%	16.7%	17.3%
Fixed-term Research Staff	26.2%	29.7%	30.0%	
Permanent Technical/ Support Staff	30.2%	15.4%	21.7%	
Fixed-Term Technical/ Support staff	20.8%	42.9%	0.0%	

\* HESA Staff Data 2007/08



**Figure 3:** Proportion of female staff in universities at each grade by broad research area

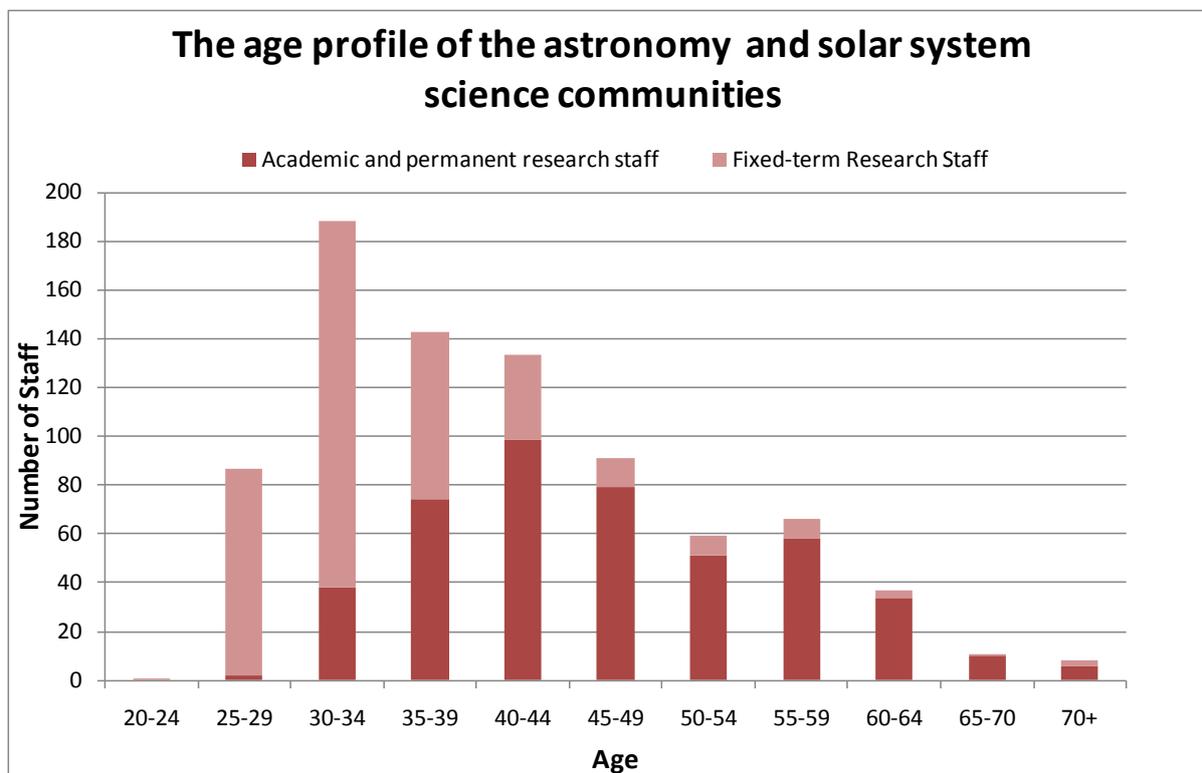
<sup>7</sup> HESA Staff Data 2007/08

A comparison with data for physics shows that in the research areas under consideration, the proportions of female staff are higher suggesting that women are more likely to work in (academic) astronomy and geophysics than in physics.

A detailed breakdown of the proportion of female staff by grade is not available from earlier studies, although some data are available from 2003. The data indicate that in common with all subjects the proportion of women is rising at all levels but that there is significant "leakage" of women in moving from junior to senior grades. Although astronomy appears to attract a higher proportion of women than physics, a major barrier to change is the fact that only around 20% of entrants to A level physics are female.

### 3.3 The age of staff

University departments and research establishments were asked to break their staff data down by age. Unfortunately, the number of staff in each 5-year age band was too small in solar system science and solid earth geophysics and in cross-disciplinary areas for meaningful analysis. The data presented below are for astronomy and solar system science combined.



**Figure 4:** The age profiles of fixed-term and permanent staff in astronomy and solar system science

Figure 4 shows data for the ages of fixed-term and permanent staff in astronomy and solar system science. The median age for fixed-term staff is 30-34 years, and for permanent staff is 40-44 years. The data in Figure 4 also suggest that a significant proportion of the fixed-term staff do not find employment in UK academia or research establishments, although they could be getting (academic) research jobs overseas.

The data in Figure 5 show the age profiles of staff in astronomy and solar system science by grade. The median ages for each grade are: 30-34 years for fixed-term and permanent research staff, 35-39 years for lecturers, 40-44 years for senior lecturers/readers, and 55-59 years for professors.

It was noted in 1998 that the age profile of the astronomy community looked healthier than in 1993 with a broad plateau for permanent staff between 35 and 55 years of age. 12 years later the age profile is better characterised as having a peak at 40-44 years of age, perhaps reflecting an increase in the number of posts over the last decade. However, the overall profile still looks relatively healthy with the supply of potential new staff being more than enough to cover retiring staff over the next few years. Nonetheless the possibility exists that the peak of staff who are currently aged 40-45 years old will simply age, as few permanent roles are likely to be created in the immediate future given the restrictions on public spending that are in place.

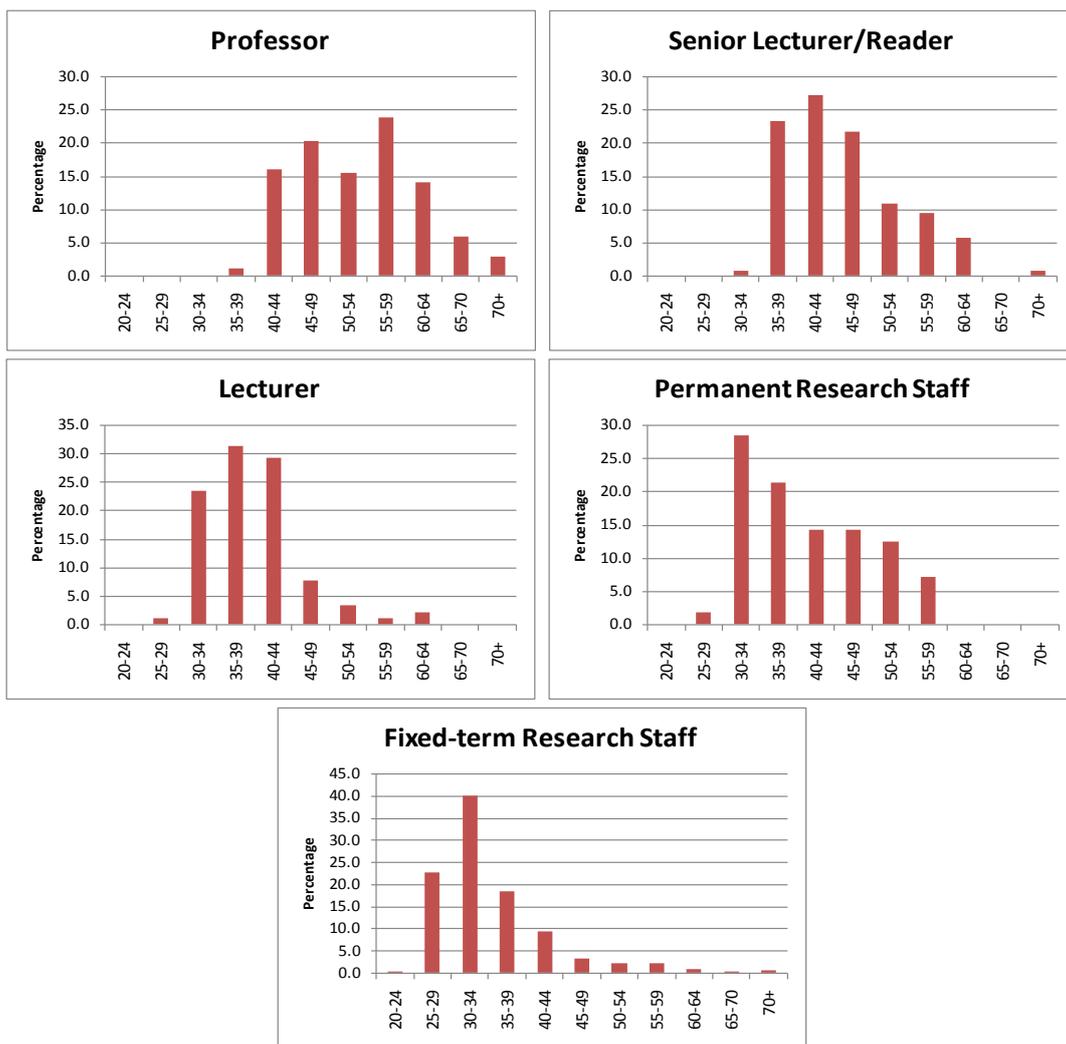
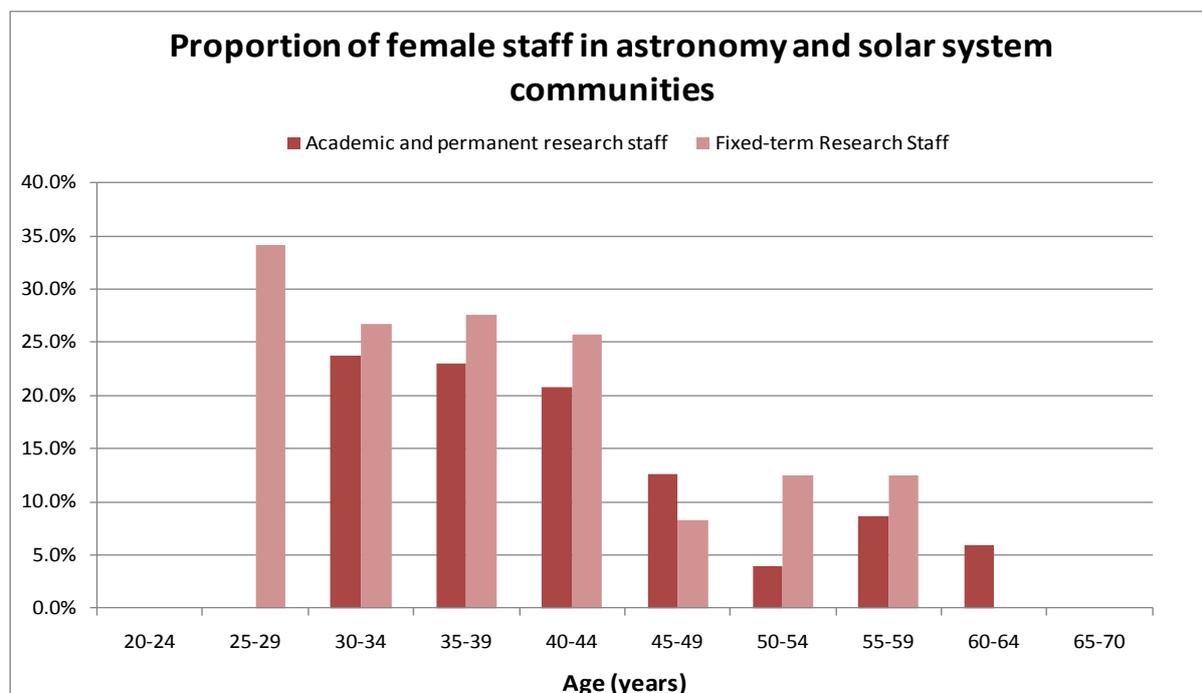


Figure 5: The age profiles of staff in astronomy and solar system science

Figure 6 illustrates that the proportion of female staff falls with age. This is partly a consequence of the smaller proportion of women who entered astronomy in the past, however it is also the case that women science graduates are less likely than men to choose to follow scientific careers and that even when they have started such careers they are less likely than men to remain in them.<sup>8</sup>



**Figure 6:** Proportion of female permanent academic and research staff and fixed-term research staff in astronomy and solar system science

### 3.4 Staff leaving and joining

Table 4 four broad research areas over the last 5 years. Data are only presented for the departments and research establishments that returned the questionnaires, so this is a sample of around 50% of the total staff cohort.

<sup>8</sup> See, for example, Change of Heart - Career intentions and the chemistry PhD, London, RSC, 2009. ([www.rsc.org/diversity](http://www.rsc.org/diversity))

**Table 4:** Staff leaving and joining by broad research area over the last 5 years\*

	Grade	Staff leaving			Staff joining			Net change		
		M	F	All	M	F	All	M	F	All
Astronomy	Permanent Academic Staff	42	5	47	41	8	49	-1	3	2
	Permanent Research Staff	9	0	9	10	11	21	1	11	12
	Fixed-Term Research Staff	266	76	342	248	91	339	-18	15	-3
	Permanent Technical/Support Staff	21	7	28	9	9	18	-12	2	-10
	Fixed-Term Technical/Support Staff	13	6	19	9	9	18	-4	3	-1
	Other scientific and Technical Staff	8	1	9	6	3	9	-2	2	0
	<b>Total</b>	<b>359</b>	<b>95</b>	<b>454</b>	<b>323</b>	<b>131</b>	<b>454</b>	<b>-36</b>	<b>36</b>	<b>0</b>
Solar System Science	Permanent Academic Staff	2	2	4	9	2	11	7	0	7
	Permanent Research Staff	5	2	7	1	0	1	-4	-2	-6
	Fixed-Term Research Staff	63	21	84	54	23	77	-9	2	-7
	Permanent Technical/Support Staff	2	1	3	0	1	1	-2	0	-2
	Fixed-Term Technical/Support Staff	3	2	5	6	3	9	3	1	4
	Other scientific and Technical Staff	1	0	1	0	0	0	-1	0	-1
	<b>Total</b>	<b>76</b>	<b>28</b>	<b>104</b>	<b>70</b>	<b>29</b>	<b>99</b>	<b>-6</b>	<b>1</b>	<b>-5</b>
Solid Earth Geophysics	Permanent Academic Staff	13	5	18	4	16	20	-9	11	2
	Permanent Research Staff	0	1	1	2	1	3	2	0	2
	Fixed-Term Research Staff	29	10	39	34	16	50	5	6	11
	Permanent Technical/Support Staff	0	0	0	2	2	4	2	2	4
	Fixed-Term Technical/Support Staff	0	0	0	3	1	4	3	1	4
	Other scientific and Technical Staff	1	0	1	1	3	4	0	3	3
	<b>Total</b>	<b>43</b>	<b>16</b>	<b>59</b>	<b>46</b>	<b>39</b>	<b>85</b>	<b>3</b>	<b>23</b>	<b>26</b>
Cross Disciplinary	Permanent Academic Staff	2.3	0.5	2.8	1	2	3	-1.3	1.5	0.2
	Permanent Research Staff	0	0	0	0	3	3	0	3	3
	Fixed-Term Research Staff	9	2	11	11	10	21	2	8	10
	Permanent Technical/Support Staff	1	0	1	0	0	0	-1	0	-1
	Fixed-Term Technical/Support Staff	10	0	10	7	1	8	-3	1	-2
	Other scientific and Technical Staff	1	0	1	0	0	0	-1	0	-1
	<b>Total</b>	<b>23.3</b>	<b>2.5</b>	<b>25.8</b>	<b>19</b>	<b>16</b>	<b>35</b>	<b>-4.3</b>	<b>13.5</b>	<b>9.2</b>

\* Data are presented only for those departments and research establishments which returned the questionnaire

The data suggest that staff number have remained relatively stable over the last 5 years: the largest turnover of staff is for fixed-term research staff which is to be expected. In all areas there have been net increases in the numbers of women. In astronomy, considering only those departments and research establishments which made full returns, the changes equate to an increase in the overall proportion of women from 14.8% to 19.4%. Similarly in solar system science there has been an increase from 24.1% to 25.1%, in solid earth geophysics an increase from 7.4% to 19.5%, and in cross-disciplinary areas an increase from 4.1% to 11.7%. It should be noted that apart from in astronomy, the number of women in

the sample is relatively small so these changes need to be treated with caution. Nonetheless the trend is that the proportion of women in the 4 broad research areas is increasing.

Table 5 presents data on the reasons given by those completing the questionnaires for why staff left. Considering fixed-term research staff, 38% left to take up a new job in academia or in a research institute abroad, and 19% for a new job in academia or in a research institute in the UK. 31% left because it was the end of their contracts or for unknown reasons. It is interesting that only 6% of fixed-term researchers are reported as leaving for a job in industry, and 4% for a job outside scientific research. Considering only the fixed-term researchers for whom destinations are known, 57% left to take up a new job in academia or in a research institute abroad, and 29% a new job in academia or in a research institute in the UK. In other words 86% of fixed term researchers in astronomy and geophysics moved on to roles within academia or research institutes. It is interesting to note that only about 8% of fixed-term research staff for whom destinations are known moved to roles in industry, which suggests that fixed-term staff are very much committed to careers in academia or research establishments, and that there are posts available for them to take up both in the UK and abroad.

**Table 5:** Reasons for leaving employment in astronomy, solar system science, geophysics and cross-disciplinary research\*

Reason for leaving	Staff Role						Total
	Permanent Academic Staff	Permanent Research Staff	Fixed-Term Research Staff	Permanent Technical/Support Staff	Fixed-Term Technical/Support staff	Other Scientific and Technical Staff	
Early retirement	19.2%	0.0%	0.4%	28.1%	2.9%	8.3%	4.2%
Normal Retirement	25.1%	17.6%	0.6%	25.0%	2.9%	16.7%	5.4%
New job in Academia/a research institute in the UK	19.5%	29.4%	19.1%	9.4%	11.8%	16.7%	18.5%
New job in Academia/a research institute abroad	25.1%	35.3%	37.8%	28.1%	2.9%	8.3%	33.4%
Move to a job in industry	1.4%	0.0%	5.5%	3.1%	8.8%	8.3%	5.0%
Move to a job outside Scientific Research	2.8%	0.0%	4.4%	0.0%	5.9%	0.0%	3.9%
End of contract	2.8%	5.9%	22.5%	0.0%	47.1%	25.0%	20.1%
Death in Service	2.8%	5.9%	0.8%	0.0%	0.0%	0.0%	1.1%
Unknown	1.4%	5.9%	8.8%	6.3%	17.6%	16.7%	8.4%
<b>Sample size</b>	<b>71.8</b>	<b>17</b>	<b>476</b>	<b>32</b>	<b>34</b>	<b>12</b>	<b>642.8</b>

\* Data are presented only for those departments and research establishments which returned the questionnaire

Similar patterns are observed for permanent academic staff and permanent research staff but the sample sizes are too small to draw any firm conclusions, although it appears to be the case that those with permanent posts are likely to move to similar roles in academia and/or research institutes.

The numbers of women were too small to allow comparisons to be made with men except for fixed-term researchers and in that group there were no significant differences observed in the destinations of men and women.

### 3.5 Postgraduate research students

Table 6 shows the number of research students registered in each of the broad research areas, including those currently writing up.

**Table 6:** Research students in Astronomy, Solar System Science and/or Solid Earth Geophysics

Broad research area	Research students in universities	Research students in research establishments	Total number of research students	Proportion of research students who are female
Astronomy	851	18	869	31.5%
Solar System Science	149	3	152	32.9%
Solid Earth Geophysics	167	2	169	35.5%
Cross Disciplinary	37	1	38	44.7%
Unknown	4	0	4	
<b>Total</b>	<b>1208</b>	<b>24</b>	<b>1232</b>	<b>32.7%</b>

The distribution of research students between the broad research areas is in line with the numbers of academic staff, however, the ratio of academic staff to research students does vary (see Table 7), with astronomy having a significantly higher ratio of research students to permanent academic staff than the other areas.

**Table 7:** Research students and permanent academic staff in universities in Astronomy, Solar System Science and/or Solid Earth Geophysics

Research area	Number of research students	Number of academic staff	Ratio of research students to academic staff
Astronomy	851	431	2.0
Solar System Science	149	117.2	1.3
Solid Earth Geophysics	167	140	1.2
Cross Disciplinary	37	30.8	1.2
<b>Total</b>	<b>1208</b>	<b>628</b>	<b>1.9</b>

Table 8 shows that 70% of research students are full-time and domiciled in the UK. Only 3% of students are studying part-time. The proportion of women among non-UK domiciled (permanently resident) students (39%) is higher than that among UK-domiciled students (32%).

**Table 8:** Number of research students studying part and full-time, and their domicile

Mode of study and domicile of research students	Number of research students		Proportion of research students who are female	Proportion of total population
	Male	Female		
Full-time, UK Domiciled Postgraduate Students	439	209	32.3%	69.8%
Full-time, Non-UK Domiciled Postgraduate Students	153	97	38.8%	26.9%
Part-time Students Postgraduate Students (UK and Non-UK Domiciled)	23	8	25.8%	3.3%
<b>Total Research Students</b>	<b>615</b>	<b>314</b>	<b>33.8%</b>	<b>100.0%</b>

There is some variation in the proportion of women by year of study, mode of study, and domicile but there are no obvious trends.

Data in Table 9 show the distribution of PhD students by year of study drawn from the returned questionnaires. The data suggest that the majority of students complete their studies within 4 years, and that the majority of students do work on into a fourth year. Data on the year of study of PhD students were not collected in earlier studies.

**Table 9:** Distribution of PhD student by year of study and broad research area

Research Area	Year of study of PhD students					
	1st Year	2nd Year	3rd Year	4th Year	5th Year	Writing up
Astronomy	168	161	141	125	12	45
Solar System Science	32	28	17	18	0	14
Solid Earth Geophysics	31	33	28	13	5	10
Cross Disciplinary	10	11	5	2	3	6
<b>Total</b>	<b>241</b>	<b>233</b>	<b>191</b>	<b>158</b>	<b>20</b>	<b>75</b>
Proportion of students in each year of study	26%	25%	21%	17%	2%	8%

Comparing the number of postgraduate research students in astronomy and solar system science with earlier studies shows that there has been a significant increase. In 1993 and

1998 the numbers of research students were 525 and 508 respectively, compared to 1000 in 2010. There has been a deliberate policy to expand the number of postgraduate students in astronomy and this might explain the increase in the numbers of research students observed. The increase may also related to the increase in the number of academic staff: the ratio of research students to academic staff for astronomy and solar system science combined is 2.0 which is a reasonable number of research students per academic staff member.

Another factor is that since 1998 the pattern of PhD studentships has changed. For example, STFC now provide 3.5 years of funding for their PhD studentships, although it is down to individual groups/departments to decide whether to offer 3, 3.5 or 4 years funding. In consequence, the total number of PhD students registered in the autumn of 2010 is likely to include a greater proportion of students in their 4th year of study compared to 1998. Therefore it is likely that the 2010 and 1998 populations are not directly comparable.

### 3.6 Total size of communities

The total sizes of the communities with interests in the broad research areas under consideration in this study are shown in Table 10. The sizes of the communities were calculated by summing the all staff and research students.

**Table 10:** The full-time equivalent sizes of the research communities in astronomy and geophysics

Broad research area	Community size
Astronomy	1689
Solar system science	371.2
Solid earth geophysics	357.2
Cross-disciplinary	203.8

The 1993 survey determined that the size of the astronomy community was 1881.2 and the 1998 survey it was 1950. The equivalent figure for 2010 is 2060.2. So overall the astronomy community has grown slightly since 1998, although the balance between staff based in research establishments and universities has changed, with more staff now working in universities than in 1998. It should be noted, however, that some of this growth in the size of the communities is likely to be because the average length of study of PhD students has increased.

## 4. Results from the individual questionnaires

The individual questionnaire was designed to collect demographic data from members of the UK astronomy and geophysics communities, to find out their detailed research interests, and how their time is divided between different tasks.

988 individuals started the on-line individual questionnaire, and 902 respondents provided enough information for analysis.

### 4.1 The sample

Table 11 shows a breakdown of the roles and gender of respondents.

**Table 11:** The roles and gender of respondents to the individual questionnaire

Role/Position of respondents	Count of respondents by gender			
	Male	Female	Unknown	Total
Professor	145	15	3	163
Reader	50	8	1	59
Senior Lecturer	34	12	1	47
Lecturer	44	16		60
Permanent Research Fellow/Staff (University)	28	4	1	33
Permanent Research Fellow/Staff (Research Facility/Research Institute)	26	3		29
Long-term visitor	4	2		6
Other	1			1
Permanent/Fixed-term Technical or support staff	24	11		35
Temporary/Fixed-term Postdoctoral Research Associate	136	65	4	205
Postgraduate Research Student	174	87	3	264
<b>Grand Total</b>	<b>666</b>	<b>223</b>	<b>13</b>	<b>902</b>

Data in Table 11 suggest that the proportion of female respondents by role/position is in line with the proportion of women in the general population of astronomers and geophysicists.

**Table 12:** Comparison of the respondents to the individual questionnaire and the population of astronomy and geophysics researchers established for university departments and research establishments

Role/Position	Individual questionnaire population		Departmental/Research establishment questionnaire population	
	N	%	N	%
Professor	163	18%	319	11%
Senior Lecturer/Reader	106	12%	218	8%
Lecturer	60	7%	166	6%
Permanent Research Fellow/Staff (University)	62	7%	97	3%
Long-term visitor	6	1%	62	2%
Temporary/Fixed-term Postdoctoral Research Associate	205	23%	557	19%
Postgraduate Research Student	264	29%	1232	43%
Technical staff	35	4%	228.2	8%
<b>Grand Total</b>	<b>901</b>	<b>100%</b>	<b>2879.2</b>	<b>100%</b>

A comparison of the distribution of the roles/positions with the population in Table 1 is shown in Table 12. These data suggest academic staff are over represented in the sample. However, since the permanent staff, fixed-term researcher, postgraduate research student and technician populations are analysed separately, their relative proportions in the population are not important.

#### 4.2 Permanent Staff

This section examines the data for permanent staff in universities and research establishments. In many Tables data for long term visitors and other staff are not presented as the numbers responding to the survey were low.

Table 13 presents data on the gender and working mode of permanent staff. 25.8% of females and 9.2% of males work part-time. This is in line with general observations that women are more likely to work part-time than men, normally because women are more likely to take on caring responsibilities than men.

**Table 13:** Gender and working mode of permanent staff responding to the individual questionnaire

Role/Position of respondents	Count of permanent staff by gender and working mode					
	Male		Female		Unknown	
	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time
Professor	126	19	10	5	2	1
Reader	48	2	7	1	1	0
Senior Lecturer	32	2	9	3	1	0
Lecturer	40	4	13	3	0	0
Permanent Research Fellow/Staff (University)	27	1	2	2	1	0
Permanent Research Fellow/Staff (Research Facility/Research Institute)	24	2	3	0	0	0
<b>Total</b>	<b>297</b>	<b>30</b>	<b>44</b>	<b>14</b>	<b>5</b>	<b>1</b>

Table 14 show the nationalities of respondents: 78% of permanent staff are British, 12% are from other European countries, 2% are from the USA, and 7% are from other countries.

**Table 14:** Nationalities of permanent staff responding to the individual questionnaire

Role/Position of respondents	Count of permanent staff by nationality			
	British	Other EU	USA	Other
Professor	142	14	1	6
Reader	48	6	0	5
Senior Lecturer	31	12	0	4
Lecturer	36	11	6	7
Permanent Research Fellow/Staff (University)	29	2	0	2
Permanent Research Fellow/Staff (Research Facility/Research Institute)	20	3	2	4
<b>Total</b>	<b>306</b>	<b>48</b>	<b>9</b>	<b>28</b>

Table 15 illustrates that 95% of respondents that indicated their ethnicity, specified their ethnicity as White. Considering only British respondents, 97% are White. Results from the 2001 census showed that 92.1% of the population were white.

8 respondents reported that they had a disability.

**Table 15:** Ethnicity of permanent staff responding to the individual questionnaire

Role/Position of respondents	Count of permanent staff by ethnicity					
	White	Indian	Chinese	Mixed: White and Asian	Other	Un-known
Professor	148	0	2	3	2	8
Reader	54	0	0	1	1	3
Senior Lecturer	41	3	1	0	0	2
Lecturer	52	0	0	0	2	6
Permanent Research Fellow/Staff (University)	28	0	0	2	0	3
Permanent Research Fellow/Staff (Research Facility/Research Institute)	25	0	0	0	1	3
<b>Total</b>	<b>348</b>	<b>3</b>	<b>3</b>	<b>6</b>	<b>6</b>	<b>25</b>

Table 16 presents data on the number of children permanent staff have (irrespective of the age of the children). The number of children increases with seniority which is, of course, related to the fact that more senior staff are older. Nonetheless, 28% of professors do not have any children.

**Table 16:** Number of children of permanent staff responding to the individual questionnaire

Role/Position of permanent staff	Count of permanent staff by number of children					
	0	1	2	3	4	>4
Professor	45	16	66	22	8	2
Reader	25	10	16	8	0	0
Senior Lecturer	19	10	11	6	0	0
Lecturer	37	6	15	2	0	0
Permanent Research Fellow/Staff (University)	19	6	8	0	0	0
Permanent Research Fellow/Staff (Research Facility/Research Institute)	14	4	4	6	0	0
<b>Total</b>	<b>159</b>	<b>52</b>	<b>120</b>	<b>44</b>	<b>8</b>	<b>2</b>

Table 17 presents data on the proportions of male and female academic staff without children. Although among professors a much larger proportion of women than men do not have children, the number of women is not large enough to allow the significance of this to be tested. Nonetheless it is worth investigating further the possibility that women in senior academic positions in astronomy are less likely to have children than men.

It is difficult to find data on the proportion of the population without children in the UK. Data from the US 2010 Census<sup>9</sup> show that 19.7% of women between 35 and 39 years old do not have children, and 18.8% of women between 40 and 44 years old. In 1985 the proportion of women of between 40 and 44 years old without children was 11.4%. Given that the proportion of women who have their first child after 45 is very low, it follows that the overall proportion of women in the US between the ages of 40 and 65 year old who do not have children is approximately 15%.

It is likely that the US figures give reasonable estimates for the UK although it should be noted that the US birth rate is higher than the UK rate.<sup>10</sup> Therefore the data suggest that senior women in academic astronomy are much more likely not to have children than women in the population as a whole, whether the figure for women aged 40-44 year old is used or that for all women between 40 and 65 years old.

**Table 17:** Proportion of permanent academic staff who responded to the individual questionnaire without children

Role/Position of respondents	Proportion of respondents without children by gender		
	Male	Female	Overall
Professor	26%	47%	28%
Senior Lecturer/Reader	40%	40%	42%
Lecturer	64%	56%	62%
<b>Total</b>	<b>26%</b>	<b>47%</b>	<b>28%</b>

17 women (29%) and 9 men (3%) have had one or more career breaks totalling more than 3 months. 14 of the women and none of the men had had career breaks for childcare.

Respondents were asked to estimate how their time is divided between a number of activities. The results are shown in Table 18.

All grades of academic staff spend between 35 and 39% of their time on research activities. Lecturers, senior lecturers and readers spend more time on undergraduate teaching (about 30%) than professors (19%), but all staff spend around 9% on postgraduate teaching. The proportion of time spent on administration and on external professional activities increases with seniority. Staff spend about 5% of their time on public engagement and outreach: long-term research visitors report spending 13% of their time on public engagement and outreach, however, the number of long-term research visitors in the sample is small

In contrast to academic staff, staff in other roles spend a higher proportion of their time undertaking research. In universities, research fellows spend about 58% of their time on

<sup>9</sup> <http://www.census.gov/>

<sup>10</sup> In 2010 the US birth rate was 66.7 live births per 1000 women between the ages of 15 and 44 years old, and in the UK the equivalent figure was 63.6.

research and only 8% of their time on undergraduate teaching, 8% on postgraduate teaching and 13% on administration.

**Table 18:** How permanent staff respondents divide their time between different activities

Role/Position of respondents	Proportion of time spent by respondents on specific activities						
	Research	Undergraduate teaching	Postgraduate teaching	Administration associated with job	External professional activities	Public engagement/outreach	Other
Professor	39%	19%	9%	21%	7%	4%	2%
Senior lecturer/Reader	35%	27%	10%	17%	6%	5%	1%
Lecturer	38%	33%	8%	13%	3%	5%	1%
Permanent Research Fellow/ Staff (Research Facility/ Research Institute)	46%	2%	8%	14%	4%	5%	22%
Permanent Research Fellow/Staff (University)	58%	8%	8%	13%	2%	3%	8%
Long term research visitor	60%	3%	5%	0%	3%	13%	16%

**Table 19:** Number and research interests of permanent staff (N=392)

Broad research area*	Count of permanent research staff by gender			
	Male	Female	Unknown	Total
Astronomy: Astronomy and/or Astrophysics	202	33	2	237
Astronomy: Particle Astrophysics	29	5		34
Solar System: Planetary Science	52	3	1	56
Solar System: Earth Observation	8	2		10
Solar System: Atmospheric Science	15	2		17
Solar System: The Sun	21	9	1	31
Solar System: Solar-Terrestrial Physics	31	8		39
Solar System: Cross Discipline Topics	16	1		17
Geophysics: Solid Earth Geophysics	50	8	1	59
Other Related Subject	36	6	1	43

\* Respondents were able to indicate more than one research area

Outside universities, research staff spend 46% of their time on research and 2% of on undergraduate teaching, 8% on postgraduate teaching and 14% on administration. This group also indicates that 22% of their time is spent on other activities which include routine observations and instrument development and management.

Table 19 shows the broad research areas which permanent staff work in. 281 respondents indicated that they research a single area, 77 indicated 2 research areas, 28 indicated 3 areas, and 6 respondents indicated 4 areas.

64% of respondents indicated that they have research interests in an *Astronomy* research area with 60% of the whole sample indicating an interest in *Astronomy and/or Astrophysics* and 9% indicating an interest in *Particle Astrophysics*, 29% indicated an interest in some aspects of *Solar System Science*, and 15% indicated an interest in *Geophysics*.

Staff were asked to indicate how they divided their research time between various activities and between the facilities they used at various wavelengths.

The data are presented in the form of the number of full-time equivalents (FTEs) expended on each research area and wavelength. To calculate these figures, the time each respondent spends on each activity was weighted by the proportion of the total time that that respondent spends on research.

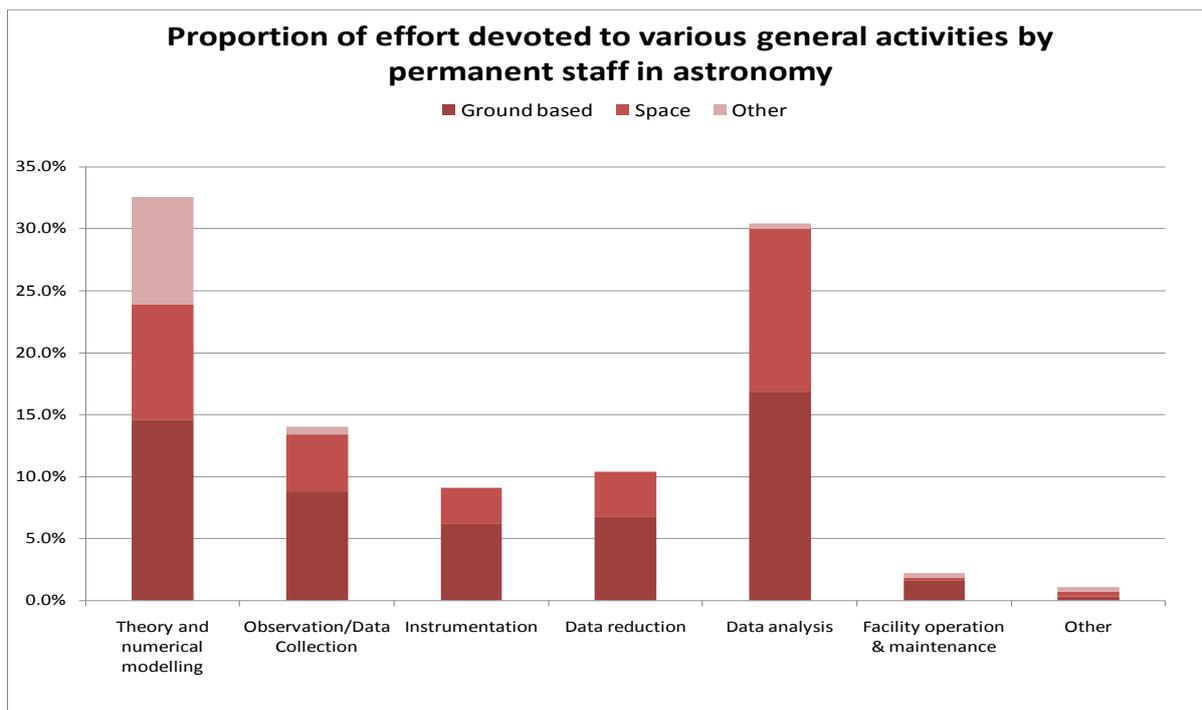
Table 20 indicates the relative effort expended on each research area by all permanently employed respondents with research interests in astronomy and Figure 7 shows the proportion of total effort expended on each general activity for astronomy.

In astronomy 33% of effort is expended on *Theory and numerical modelling* and 30% is expended on *Data analysis*. Smaller proportions of effort are expended on *Observation/Data Collection* (14%), *Data reduction* (11%), and *Instrumentation* (9%). Significantly less effort is expended in *Facility operation and maintenance* (2%) and *Other* activities (1%). Activities are split between *Ground-based* (55%), *Space* (34%) and *Other* (11%) areas.

**Table 20:** The distribution of research effort of respondents with permanent roles with interests in astronomy shown as full-time equivalents (N=343)\*

General research area	Research effort expended (FTEs)			
	Ground-based	Space	Other	Totals
Theory and numerical modelling	18.1	11.6	10.8	40.5
Observation/Data Collection	11.0	5.7	0.8	17.5
Instrumentation	7.7	3.6	0.1	11.3
Data reduction	8.4	4.5	0.1	13.0
Data analysis	21.0	16.4	0.5	37.8
Facility operation & maintenance	2.0	0.3	0.5	2.8
Other (please specify below)	0.4	0.5	0.5	1.4
<b>Totals</b>	<b>68.6</b>	<b>42.6</b>	<b>13.2</b>	<b>124.4</b>

\* Table 20 contains information on all respondents who indicated a broad research interest in an astronomy-related research area. There is some overlap with the respondents included in Table 22 who indicated research interests in both astronomy and geophysics.

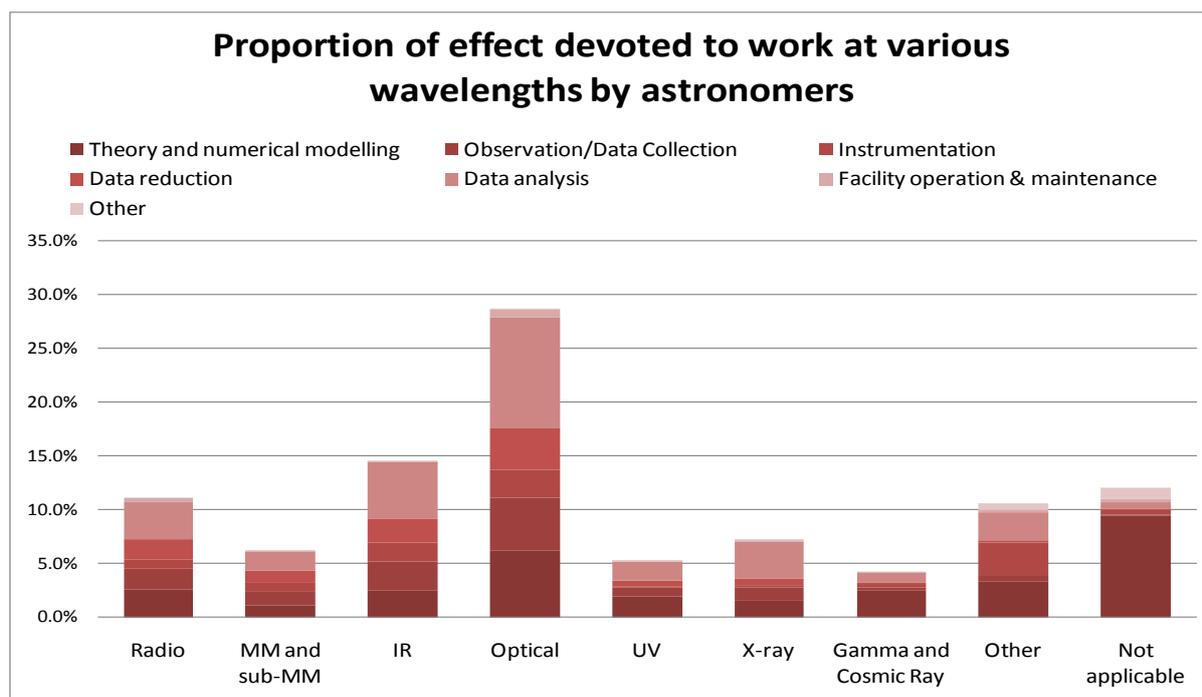


**Figure 7:** Proportion of effort spent on various general research activities by respondents with research interests in astronomy

Table 21 shows the pattern of use of facilities at various wavelengths by those respondents with research interests in astronomy as FTEs and Figure 8 presents the data as proportions of total effort.

**Table 21:** The pattern of use of facilities at various wavelengths by respondents with permanent roles with interests in astronomy shown as full-time equivalents (N=343)

General area of research	Research effort expended on facilities by wavelength (FTEs)									
	Radio	MM and sub-MM	IR	Optical	UV	X-ray	Gamma and Cosmic Ray	Other	Not applicable	Totals
Theory and numerical modelling	2.9	1.3	2.8	6.9	2.1	1.7	2.8	3.6	10.3	34.3
Observation/Data Collection	2.1	1.3	3.0	5.3	1.0	1.4	0.3	0.7	0.1	15.1
Instrumentation	0.9	1.0	1.9	2.9	0.1	0.1	0.4	3.2	0.5	11.0
Data reduction	2.1	1.2	2.4	4.2	0.6	0.8	0.1	0.2	0.2	11.9
Data analysis	3.8	2.0	5.8	11.3	1.9	3.7	1.0	2.8	0.7	32.9
Facility operation & maintenance	0.4	0.1	0.1	0.8	0.1	0.2	0.2	0.3	0.3	2.4
Other	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.7	1.1	1.9
<b>Totals</b>	<b>12.2</b>	<b>6.8</b>	<b>16.0</b>	<b>31.4</b>	<b>5.7</b>	<b>8.0</b>	<b>4.7</b>	<b>11.6</b>	<b>13.1</b>	<b>109.5</b>



**Figure 8:** Proportion of effort spent on use of facilities at various wavelengths by respondents with permanent roles with research interests in astronomy

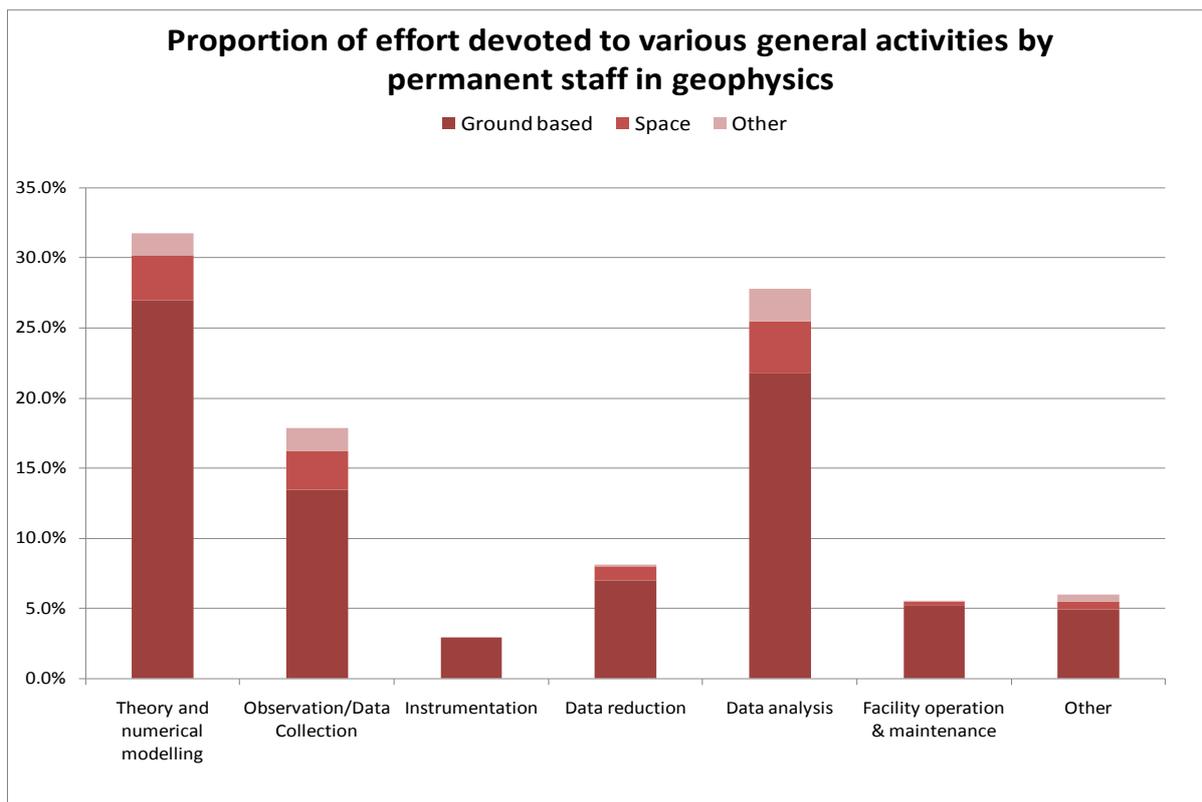
The data show that the greatest use is made of facilities at optical wavelengths, followed by infra-red and radio.

Table 22 indicates the relative effort expended on each research area by all permanently employed respondents with research interests in astronomy and Figure 9 shows the proportion of total effort expended on each general activity for astronomy.

**Table 22:** The distribution of research effort of respondents with permanent roles with interests in geophysics shown as full-time equivalents (N=59)\*

General research area	Research effort expended (FTEs)			Totals
	Ground-based	Space	Other	
Theory and numerical modelling	6.9	0.8	0.4	8.1
Observation/Data Collection	3.4	0.7	0.4	4.5
Instrumentation	0.7	0.0	0.0	0.8
Data reduction	1.8	0.3	0.0	2.1
Data analysis	5.5	0.9	0.6	7.1
Facility operation & maintenance	1.3	0.1	0.0	1.4
Other (please specify below)	1.3	0.1	0.1	1.5
<b>Totals</b>	<b>20.9</b>	<b>2.9</b>	<b>1.6</b>	<b>25.4</b>

\* Table 22 contains information on all respondents who indicated a broad research interest in geophysics. There is some overlap with the respondents included in Table 20 who indicated research interests in both astronomy and geophysics.



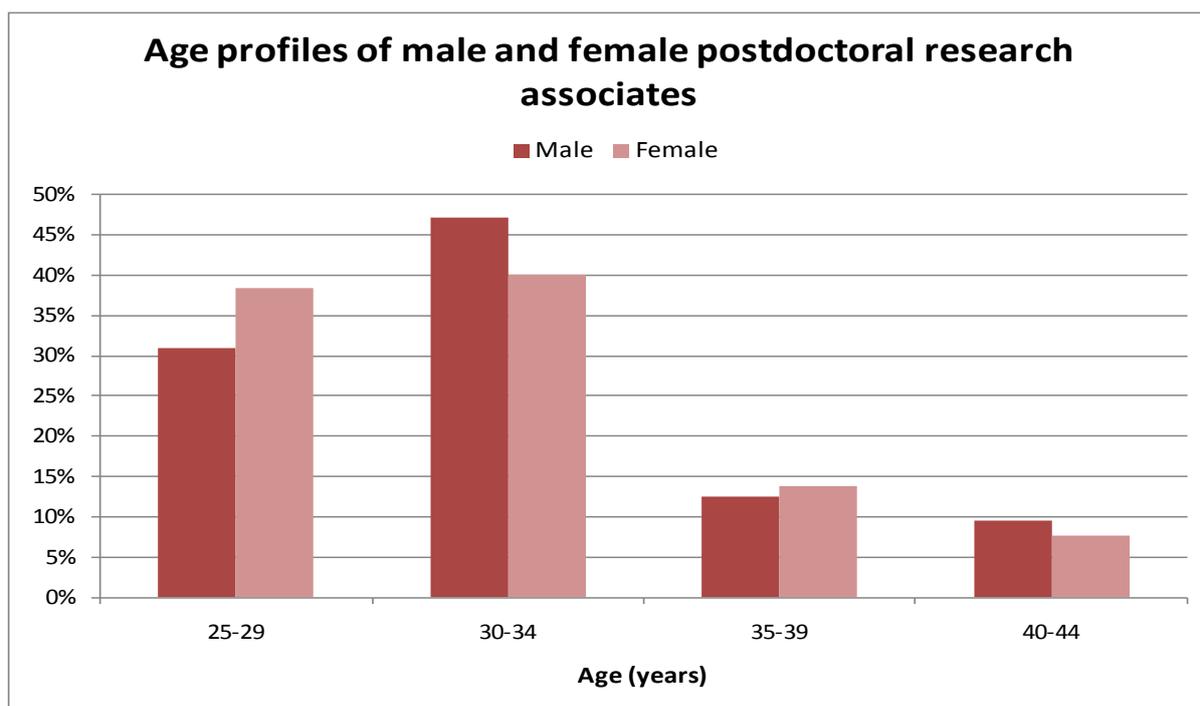
**Figure 9:** Proportion of effort spent on various general research activities by respondents with research interests in geophysics

In Geophysics 32% of effort is expended on *Theory and numerical modelling* and 28% is expended on *Data analysis* and 18% on *Observation/Data Collection*. Less effort is expended on *Data reduction* (8%), *Facility operation and maintenance* (6%), *Instrumentation* (3%) and *Other activities* (6%). In contrast to astronomy, effort is biased towards *Ground-based activities* at 82%, with *Space activities* representing 12% of effort and *Other activities* 6%.

Respondents were asked to indicate their main research areas by selecting up to 5 research areas from lists specified for astronomy, solar system science and solid earth geophysics, or from the broad areas. Those respondents indicating research interests in *stars*, *galaxies/extragalactic*, *cosmology*, and/or *planetary science* were asked to give more detail. A full breakdown of the responses is shown in Appendix A and the overall results are discussed in Section 4.5.

## 4.2 Fixed-term postdoctoral research associates

As noted above, 205 respondents who completed the questionnaire indicated that they were temporary/fixed-term postdoctoral research associates, comprising 136 males, and 65 females (4 respondents did not indicate their gender). 4 males and 8 females indicated that they worked part-time. 4 staff reported that they considered themselves disabled.



**Figure 10:** Age profiles of male and female postdoctoral research associates

As shown in Figure 10 there is relatively little difference between the age profiles of male and female research associates: the women in the sample are on average slightly younger than the males. This is in line with larger studies of postdoctoral researchers which show that women holding postdoctoral research posts are younger, and tend to spend less time in these roles than men.

**Table 23:** The age and length of time since postdoctoral research associate respondents completed their PhDs

Number of years since respondents obtained their PhD	Count of postdoctoral research associates by age in years							
	25-29	30-34	35-39	40-44	45-49	50-54	55-59	Total
Not yet	4	4	0	1	0	0	0	9
1	29	8	0	0	0	0	0	37
2	18	14	0	0	1	0	0	33
3	7	15	0	0	0	0	0	22
4	10	14	0	0	0	0	0	24
5	0	11	3	1	0	0	0	15
6	0	12	4	0	0	0	0	16
7-9	0	14	12	3	0	1	0	30
>10	0	0	8	4	5	1	1	19
<b>Totals</b>	<b>68</b>	<b>92</b>	<b>27</b>	<b>9</b>	<b>6</b>	<b>2</b>	<b>1</b>	<b>205</b>

Table 23 shows the age and length of time since postdoctoral research associates completed their PhDs. 49% of respondents had completed their PhD within the last 4 years, and 61% with the last 5 years.

**Table 24:** Ethnicity and nationality of postdoctoral research associates

Ethnicity	Count of postdoctoral research associates by nationality				
	British	Other European Union	USA	Other	Total
White	115	52	3	9	179
Indian	2	0	0	1	3
Chinese	0	0	0	7	7
Mixed	2	1	0	0	3
Other	0	1	0	1	2
Do not wish to say	7	3	1	0	11
<b>Totals</b>	<b>126</b>	<b>57</b>	<b>4</b>	<b>18</b>	<b>205</b>

The ethnicity and nationality of the postdoctoral research associate respondents is shown in Table 24. Overall 61% of respondents are British, and, of these, 97% of those who indicated their ethnicity are White. 25% of the sample are of other European Union nationalities and, like the British sample, 96% of those who indicated their ethnicity are White. Only 10% of the sample indicated that they hold citizenship from outside the European Union or the United States.

Table 25 shows the nationality of respondents together with the country in which they carried out their PhD research. 70% of all respondents, and 95% of British respondents, carried out their PhD research in the UK.

**Table 25:** Nationality and country in which postdoctoral research associates studied for their PhD

Country in which postdoctoral research associates studied for their PhD	Count of postdoctoral research associates by nationality				
	British	Other European Union	USA	Other	Total
UK	120	17	0	6	143
Other European Union	1	35	0	5	41
USA	2	1	4	1	8
Elsewhere	3	4	0	6	13
<b>Totals</b>	<b>126</b>	<b>57</b>	<b>4</b>	<b>18</b>	<b>205</b>

The proportion of time that postdoctoral associates spend on various activities is shown in Table 26. On average 82% of time is spent on research activities which is more than double the proportion of time spent by permanent academic staff. This figure is not surprising: in fact 97 respondents indicated that they spend at least 90% of their time on research-related activities.

Postdoctoral associates report spending relatively little time on teaching, administration, or public engagement activities. While postdoctoral research associates would be expected to carry out much formal teaching activities, it is likely that they will help in the supervision of research students, although the data suggest that respondents probably regard that as part of their research activities.

**Table 26:** How postdoctoral research associates divide their time between different activities

Activity	Proportion of time spent on specific activities
Research	82%
Undergraduate teaching	5%
Postgraduate teaching	2%
Administration associated with job	4%
Public engagement/ outreach	3%
Other	5%

Among the "other" activities respondents listed activities such as organising conferences, writing research proposals, and training instrument users.

Table 27 shows the broad research areas in which postdoctoral research associates work. 165 respondents indicated activity in a single research area, 28 indicated 2 areas, 5 indicated 3 areas, and 1 respondents indicated 5 areas.

**Table 27:** The main research areas of postdoctoral research associates (N=200)

Broad research area of postdoctoral research associates*	Count of postdoctoral research associates by gender			
	Male	Female	Unknown	Total
Astronomy: Astronomy and/or Astrophysics	81	44	1	126
Astronomy: Particle Astrophysics	6	3	1	10
Solar System: Planetary Science	17	4	1	22
Solar System: Earth Observation	4	3	1	8
Solar System: Atmospheric Science	10	3	1	14
Solar System: The Sun	11	1	1	13
Solar System: Solar-Terrestrial Physics	15	3	1	19
Solar System: Cross Discipline Topics	2	1		3
Geophysics: Solid Earth Geophysics	6	5		11
Other Related Subject	13	6	1	20

\* Respondents were able to indicate more than one research area

65% of respondents indicated that they have interests in some aspect of *Astronomy*, 27% indicated an interest in some aspects of *Solar System Science*, and 6% indicate an interest in *Geophysics*.

**Table 28:** The distribution of research effort of respondents who are postdoctoral research associates with interests in astronomy shown as full-time equivalents (N=173)\*

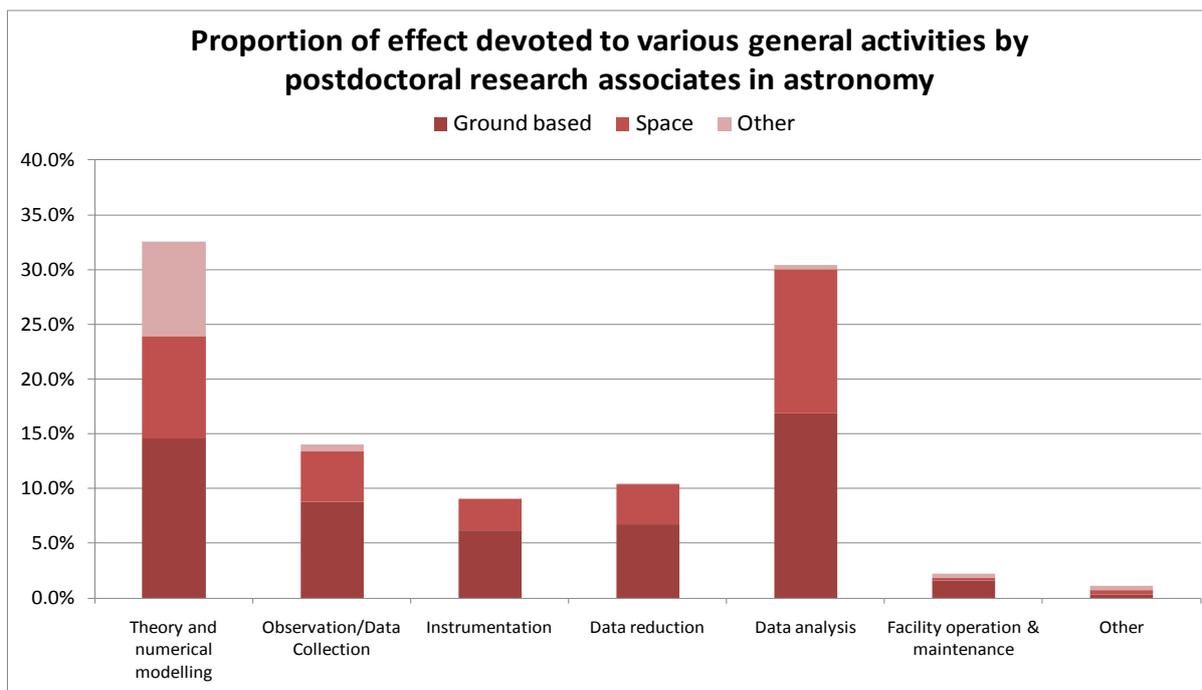
General research area	Research effort expended (FTEs)			
	Ground-based	Space	Other	Totals
Theory and numerical modelling	20.5	6.8	17.2	44.5
Observation/Data Collection	7.9	3.5	0.5	12.0
Instrumentation	5.1	2.3	0.1	7.6
Data reduction	12.3	6.1	0.4	18.7
Data analysis	25.3	26.7	1.8	53.8
Facility operation & maintenance	0.9	0.8	0.2	1.9
Other (please specify below)	2.2	0.3	0.6	3.1
<b>Totals</b>	<b>74.2</b>	<b>46.6</b>	<b>20.7</b>	<b>141.5</b>

\* Table 28 contains information on all respondents who indicated a broad research interest in an astronomy-related research area.

Table 28 presents data on how postdoctoral research associate respondents with research interests in astronomy expend their research time in terms of full-time equivalent members of staff (FTEs) and Figure shows the proportion of total effort expended on each general activity. Data are not presented for postdoctoral research associates with research interests in geophysics as there were very few survey responses from this group.

As would be expected, the pattern of usage shown in Figure 11 is very similar to that for permanent staff in astronomy. 31% of effort is expended on *Theory and numerical*

modelling and 38% on *Data analysis*. For permanent staff the figures were 33% and 30% respectively. Smaller proportions of effort are expended on *Observation/Data Collection* (8%), *Data reduction* (13%), and *Instrumentation* (5%). The least effort is expended in *Facility operation and maintenance* (1%) and *Other* activities (2%). Activities are split 55%, 33% and 15% between *Ground-based*, *Space* and *Other* areas respectively, compared to 55%, 34% and 11% respectively for permanent staff.

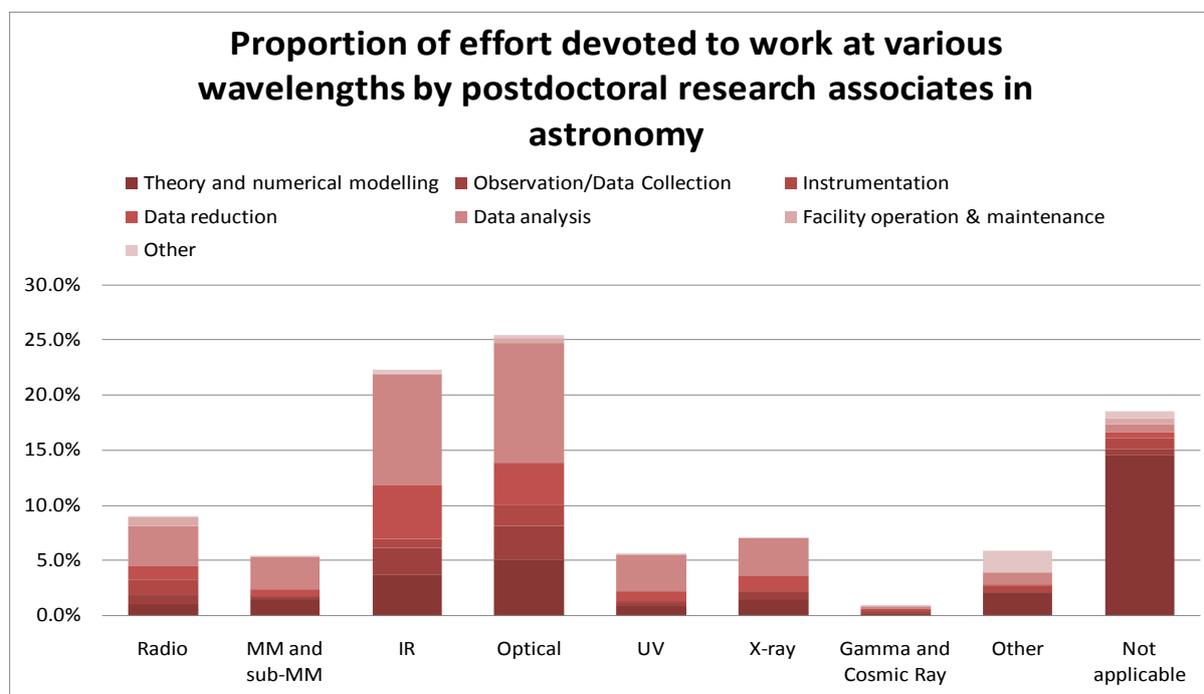


**Figure 11:** Proportion of effort spent on various general research activities by postdoctoral research associates with research interests in astronomy

**Table 29:** The pattern of use of facilities at various wavelengths by postdoctoral research associates with research interests in astronomy shown as full-time equivalents (N=173)\*

General area of research	Research effort expended on facilities by wavelength (FTEs)									
	Radio	MM and sub-MM	IR	Optical	UV	X-ray	Gamma and Cosmic Ray	Other	Not applicable	Totals
Theory and numerical modelling	1.2	1.8	4.5	6.1	1.1	1.8	0.2	2.5	17.6	36.7
Observation/Data Collection	1.1	0.3	2.9	3.7	0.4	0.9	0.2	0.0	0.6	10.1
Instrumentation	1.6	0.1	1.0	2.2	0.3	0.0	0.2	0.8	1.2	7.3
Data reduction	1.6	0.8	5.8	4.7	1.0	1.7	0.1	0.2	0.7	16.4
Data analysis	4.2	3.5	12.1	13.0	4.0	4.1	0.2	1.3	0.8	43.3
Facility operation & maintenance	1.0	0.0	0.1	0.5	0.0	0.0	0.1	0.1	0.7	2.5
Other (please specify below)	0.1	0.0	0.4	0.3	0.0	0.0	0.1	2.3	0.7	4.0
<b>Totals</b>	<b>10.8</b>	<b>6.4</b>	<b>26.8</b>	<b>30.6</b>	<b>6.7</b>	<b>8.5</b>	<b>1.1</b>	<b>7.1</b>	<b>22.3</b>	<b>120.3</b>

Table 29 shows the pattern of use of facilities at various wavelengths by postdoctoral research associates with research interests in astronomy as FTEs and Figure 12 presents the same data as proportions of total research effort.



**Figure 12:** Proportion of effort spent on various general research activities by fixed-term postdoctoral research associates with research interests in astronomy

As with the permanent staff, the data show that the greatest use is made of facilities at optical wavelengths, followed by facilities operating in the infra-red and radio.

A full breakdown of the postdoctoral research associates' research interests is shown in Appendix A and the overall results are discussed in Section 4.5.

### 4.3 Postgraduate research students

268 research students attempted the questionnaire of which 4 did not complete the questionnaire and 13 reported that they did not have work in areas related to Astronomy or Geophysics. 241 students are studying for doctorates and 8 for masters degrees. 10 students are studying part-time. 6 research students reported that they considered themselves to be disabled.

Of the 249 respondents working in areas related to astronomy or geophysics, 65% are male, 34% are female and 1% did not indicate their gender. Of the 25 respondents who indicated interests in geophysics, 12 (48%) are male and 13 (52%) are female. Although the sample is small, these data do suggest that there are a significantly larger proportion of female research students in geophysics research than in astronomy research.

As shown in Table 30, overall 68% of postgraduate research students are British, 16% are from elsewhere in the European Union, and 2% are from the USA. There is no significant difference between the distributions of nationalities of males and females.

**Table 30:** The nationality and gender of postgraduate research students in astronomy and geophysics (N=249)

Nationality of postgraduate research students	Number and gender of postgraduate research students		Proportion of research students by nationality
	Male	Female	
British	123	54	68.2%
Other European Union	23	19	15.9%
USA	1	5	2.3%
Other	27	9	13.6%
<b>Total</b>	<b>174</b>	<b>87</b>	<b>100.0%</b>

Table 31 shows the sources of funding for postgraduate students in astronomy and geophysics. 211 respondents indicated a single source of funding, 32 indicated 2 sources of funding and 4 respondents indicated 3 sources. The majority of British students (66%) receive funding from the STFC and another 11% receive funding from NERC and 11% from the university or department. 40% of non-British students are supported by their host university and/or department, and 19% by research councils. 12% of all students indicated that have "other" sources of funding which comprise a variety of sources including Marie Curie Fellowships, funding from the research students' home governments, and funding

from the Scottish Universities Physics Alliance (SUPA). 7% of research students are self-funded.

**Table 31:** Sources of funding and nationality for postgraduate research students in astronomy and geophysics

Funding source*	Nationality of research students			
	British	Other European Union	Other	Total
STFC	126	11	5	142
NERC	22	1	1	24
The University/Department	22	18	20	60
Industry	7	0	1	8
Self-Funded	8	5	7	20
Other	7	11	15	33
<b>Total</b>	<b>192</b>	<b>46</b>	<b>49</b>	<b>287</b>

\* Respondents were able to indicate multiple funding sources

Table 32 shows the broad research areas which post graduate research students work in. 218 respondents indicated a single research area, 26 indicated 2 areas, 4 indicated 3 areas, and 1 respondent indicated 4 areas.

**Table 32:** The main research areas of postgraduate research students

Broad Research Area*	Number of research students by gender			
	Male	Female	Unknown	Total
Astronomy: Astronomy and/or Astrophysics	106	50	2	158
Astronomy: Particle Astrophysics	6	2		8
Solar System: Planetary Science	17	8		25
Solar System: Earth Observation	4	1		5
Solar System: Atmospheric Science	7	4		11
Solar System: The Sun	8	1		9
Solar System: Solar-Terrestrial Physics	11	2		13
Solar System: Cross Discipline Topics	3	2		5
Geophysics: Solid Earth Geophysics	12	13		25
Other Related Subject	14	13		

\* Respondents were able to indicate more than one research area

63% of respondents indicated that they have interests in astronomy and/or astrophysics, 27% indicated an interest in some aspects of solar system science, and 10% indicate an interest in geophysics.

Postgraduate research students were not asked the details of how they divided their time. It was assumed that the overwhelming majority of their time would be spent on research.

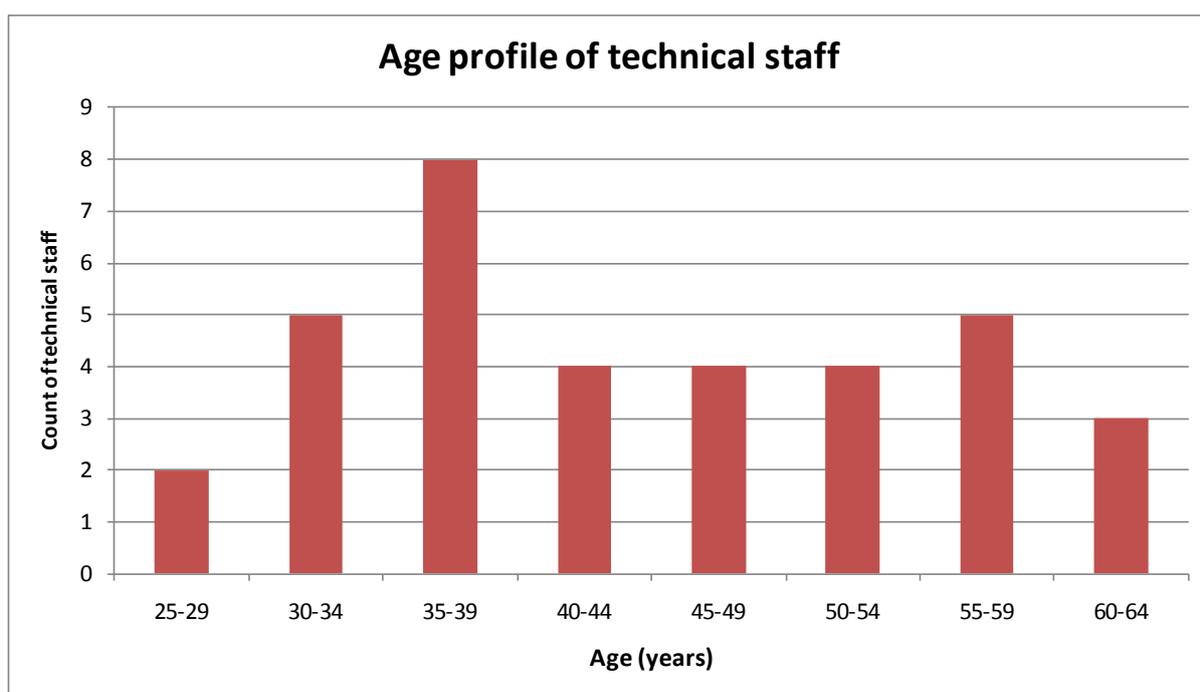
A full breakdown of the postgraduate research students' research interests is shown in Appendix A and the overall results are discussed in Section 4.5.

#### 4.4 Technical staff

35 technical staff completed the questionnaire. 11 (31%) of the sample were female and 24 (69%) were male. Only one person worked part-time. 4 of the female staff and 3 of the male staff, were in temporary posts.

29 (83%) of the technicians were British, and 32 (91%) reported their ethnicity as White, including all the British staff.

14 staff reported that they supervised research students.



**Figure 13:** The age profile of technical staff in astronomy and geophysics

Figure 13 shows the age profile of the technical staff. The sample includes staff across the full working age range but is too small to draw any firm conclusions.

32 technicians provided information on how they divided their time between various general activities. The results are shown in Table 33. As with the age data, the sample size is too small to draw firm conclusions, but it is clear that technical staff spend relatively little time on teaching, administration, outreach and other activities. Rather, technical staff split

their time between general support activities, Facility operations and maintenance, Instrumentation and/or research activities.

**Table 33:** How technical staff divide their time between different activities (N=32)

Activity	Proportion of time
Support	30%
Facility operations and maintenance	21%
Instrumentation	21%
Research	16%
Teaching	4%
Administration	3%
Public engagement/Outreach	1%
Other	4%

Table 34 presents data on whether technicians work on ground-based or space-base facilities. The data suggest that that there is a bias towards ground-based work.

**Table 34:** Whether technicians' work is ground-based or space-based (N=31)

Nature of work	Count
Both space- and ground-based	5
Ground-based	16
Space-based	7
Not applicable	3
<b>Total</b>	<b>31</b>

Respondents were asked about their pattern of use of facilities at various wavelengths. The results are shown in Table 34. 10 respondents indicated that they did not work on any specific wavelength. Of the remaining 22 respondents that provided data, 14 specified a single wavelength region, 5 specified 2 regions, and one specified 3 regions.

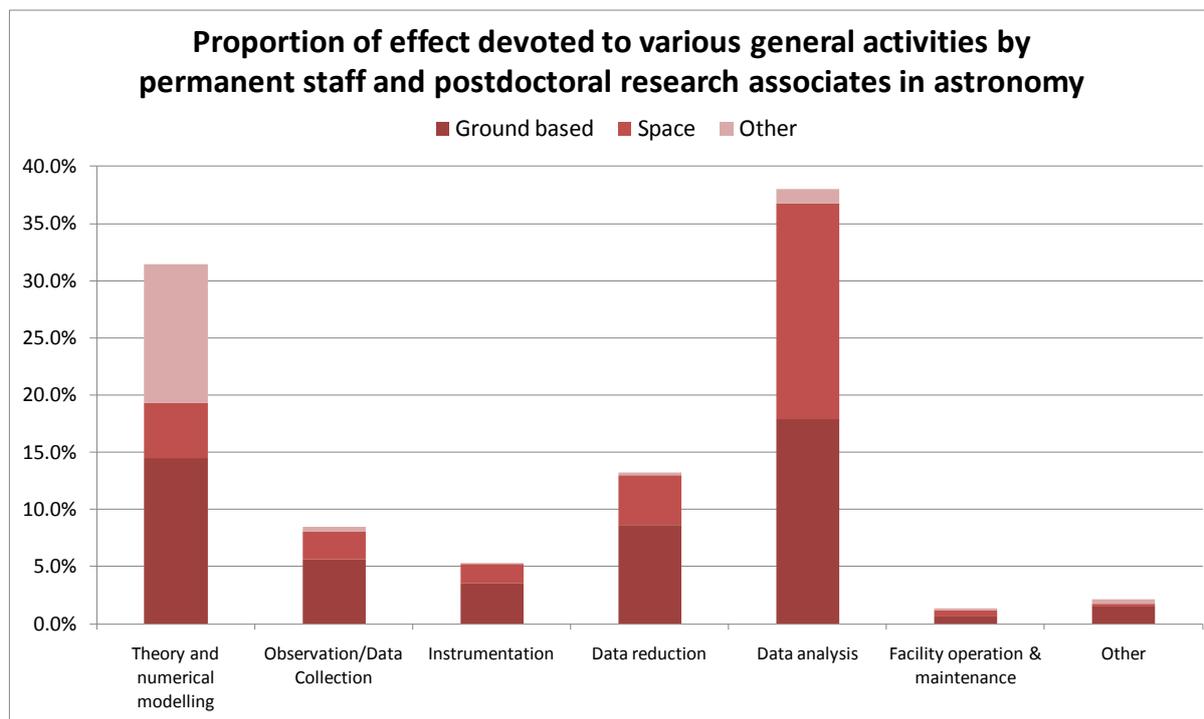
In line with the data for other staff, the most frequently used facilities operate in the optical, infrared and radio, MM and sub-MM regions.

**Table 35:** Use of facilities at various wavelengths by technical staff (N=32)

Wavelength region	Count
Not applicable	10
Radio MM and sub-MM	8
IR	7
Optical	13
UV	2
X-ray	1
Gamma and Cosmic Ray	0
Other	2

#### 4.5 Overall results from individual questionnaires

Although the majority of data generated by the individual questionnaires was designed to be analysed by category of individual, i.e., permanent staff, postdoctoral research associates, postgraduate research students and technical staff, some data, in particular that for permanent staff and for postdoctoral research associates can usefully be considered together.



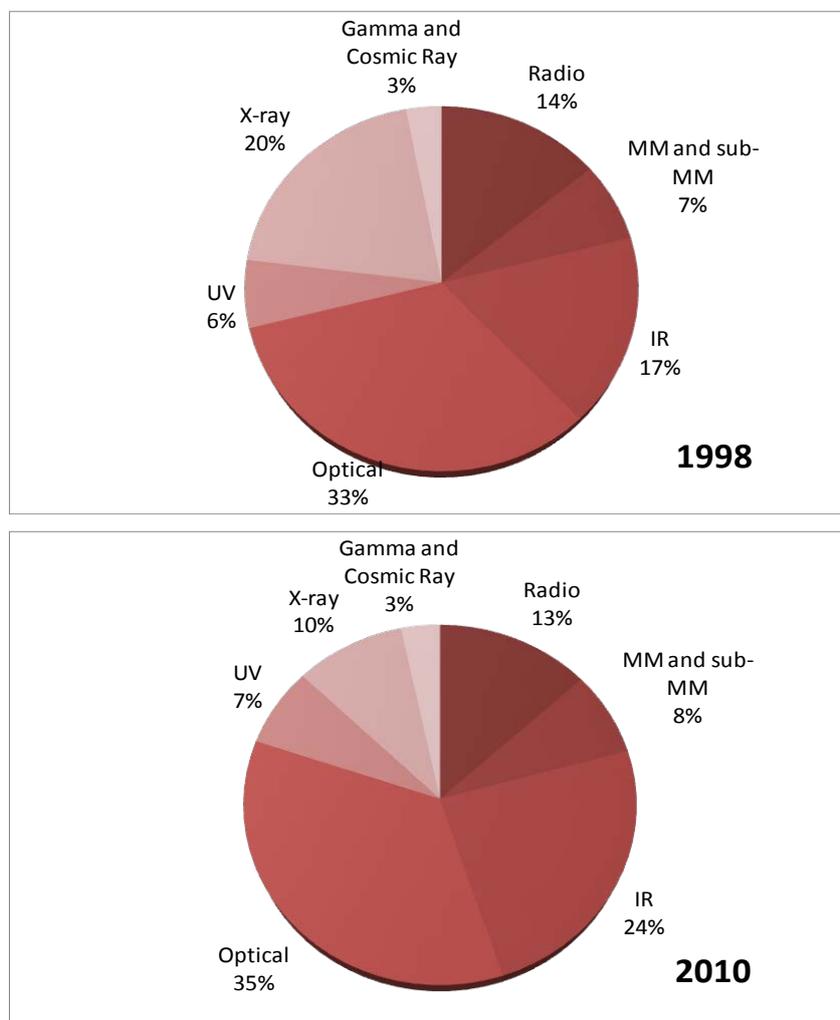
**Figure 14:** Proportion of effort spent on various general research activities by permanent staff and fixed-term researchers with research interests in astronomy

Figure 14 shows the combined data for permanent staff and postdoctoral research associates for proportion of total effort expended on each general research activity. 32% of

effort is expended on *Theory and numerical modelling* and 35% on *Data analysis*, 11% on *Observation/Data Collection*, 12% on *Data reduction*, and 7% on *Instrumentation*, 2% on *Facility operation and maintenance* and 2% on *Other* activities. Activities are split 54%, 34% and 13% between *Ground-based*, *Space* and *Other* areas respectively.

Figure 15 shows just the relative proportions of effort devoted to facilities in different wavelength regions from the current study and that from the 1998 survey. Once again the 2010 data are generated by combining the data for permanent staff and fixed-term postdoctoral research associates.

The data show that there has been relatively little change in the proportions of effort between 1998 and 2010 except at X-ray wavelengths where the proportion of effort has fallen from 20% to 10% and that the effort expended on the IR region has increased from 17% to 24%.



**Figure 15:** Relative proportions of effort devoted to facilities in different wavelength regions from the current study and that from the 1998 survey.

A full breakdown of the detailed research interests of researchers is presented in Appendix A. The popularity of each research area was judged by summing the number of permanent staff, post doctoral researchers and research students who indicated an interest in that area. No account was taken of the number of research interests each individual indicated. The relative popularity of each area was ascertained by calculating the proportion of the total "votes" that each sub-area received within *astronomy*, *solar system science* and *solid earth geophysics* respectively, and also across all research areas.

Within *Astronomy* the most popular research areas were *Galaxies/Extragalactic* (19.6%), *Stars*(14.8%) and *Cosmology* (12.2%) and *Radio, sub millimetre, infrared sources or background* (9.1%). The most popular areas within *Galactic and Extragalactic Research* are *Formation and Evolution* (26.4% within sub-field), *Active Galaxies* (18.3%) and *Normal Galaxies* (17.8%). Within *Stellar Research* the most popular areas are *Binary Stars* (19.9% within sub-field), *Formation and Evolution* (19.9%) and *Variable (pulsating/eruptive) stars* (12.6%). Within *Cosmology Research*, the most popular research areas are *Large scale structure* (32.8% within sub-field) and *Dark matter* (25.6%).

Within *Solar System Science* the most popular research areas were *Magnetosphere(s) (Induced Magnetospheres, Cometary Plasmas)* (10.4%), *Cross Discipline Area — Plasma physics (including space, solar, astrophysical and laboratory)* (9.6%), and *Solar Studies* (9.1%). Of those who indicated their interests in planetary science, 28.5% indicated an interest in the *Earth*, 19.1% in *Mars*, and 18.4% in the *Gas Giants*.

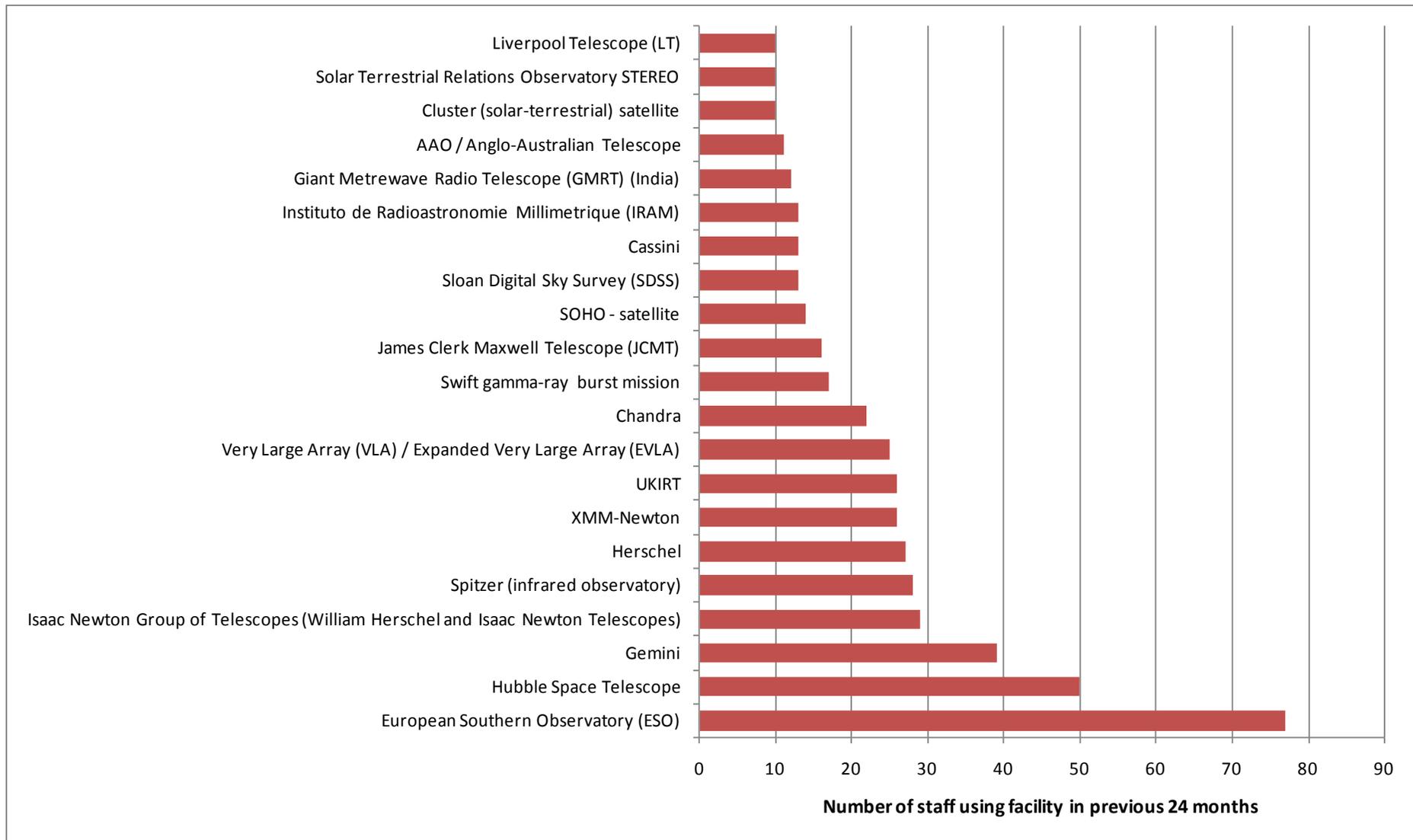
Within *Solid Earth Geophysics* the most popular research areas are *Earth Structure* (11.4%), *Seismology* (11.1%) and *Tectonophysics* (10.2%).

#### 4.6 Facilities

Permanent staff and postdoctoral fellows who responded to the individual questionnaire were asked to list the major facilities that they had used in the UK and abroad within the last 24 months. The data for permanent staff were analysed by classifying the facilities by research area or whether they were computing facilities, and where appropriate by operating wavelength. Research vessels were also identified. The facilities listed were not correlated with the specific research areas respondents had listed.

The facilities used by 10 or more permanent staff in the previous 24 months are presented in Figure 16.

The Demographics and Research Interests of the UK Astronomy and Geophysics Communities 2010



**Figure 16:** The facilities most frequently used by permanent staff in astronomy and geophysics in the previous 24 months

Data are presented in Table 36 on the operating wavelengths of facilities and the popularity of their use. The frequency which a facility is mentioned is not necessarily a direct measure of its usage given that respondents were asked to list all the facilities they had used in the last two years, without indicating the frequency of usage.

**Table 36:** Operating frequencies of research facilities and their usage by permanent staff in the previous 24 months

Operating frequencies of facilities*	Number of staff using individual facilities in previous 24 months*
Optical/ Infrared	199
Radio	139
Infrared	60
UV/ Optical/ Infrared	50
X-ray	49
Optical	47
Gamma Ray	34
Submillimetre	30
Infrared/ Submillimeter	27
Optical/ UV	20
Gravity Wave	12
UV	10
X-ray/ UV/ Optical	9
Optical/ Infrared/ Solar	9
Cosmic Ray	2
Radio/ Submillimetre	2
Dark Matter	1

\* Figures represent the total number of mentions of individual facilities in each category

Table 37 presents data on the research areas to which the facilities listed can be applied and the popularity of usage

**Table 37:** Research areas to which the research facilities listed can be applied and their usage by permanent staff in the previous 24 months

Research area(s) to which facilities can be applied	Number of staff using individual facilities in previous 24 months*
Astronomy/ Solar System Science	366
Astronomy	328
Solar System Science	162
Geophysics	86
Astronomy/ Geophysics	1

\* Figures represent the total number of mentions of individual facilities in each category

In addition, 8 respondents listed using research vessels, and 15 respondents listed using computer facilities.

The facilities listed, and their operating wavelengths/research areas are in line with the findings presented throughout the rest of this report. Clearly the continued health of UK astronomy solar system science and geophysics depends on UK researchers having access to national and international research facilities.

## 5 Conclusions

### 5.1 Departmental and research establishment questionnaires

41 university departments/research groups and 4 research establishments returned the questionnaire. Data for a further 27 university departments and one other research establishment were taken from their websites.

Astronomy is the most populous research area with 838 staff, followed by solar system science with 222, and solid earth geophysics with 190. 160 staff were recorded as working in cross-disciplinary areas.

Among academic staff, there is a high proportion of professors in all research areas: 47% of astronomy staff on academic grades are professors, 39% of staff in solar system science, 47% of staff in solid earth geophysics, and 56% of staff in cross disciplinary areas. The number of professors has risen significantly since 1993: the data suggest that the number of university professors in astronomy and solar system science has more than doubled. The number of readers and senior lecturers has also significantly risen, but the number of lecturers has remained about the same. Overall there has been a significant rise in the number of permanent academic staff with research interests in astronomy and solar system science from 292 in 1993, through 312 in 1998, to 498 in 2010.

It is difficult to explain why this may be the case: it was noted in 1998 that running astronomy courses was a good strategy for attracting students into physics departments. It is possible that this trend has continued and in consequence greater numbers of astronomy staff have been employed. Unfortunately it is difficult to establish exactly how many undergraduate students are reading astronomy as many courses are based in physics departments and a significant proportion of students are reading astronomy as part of a 'natural sciences' degree.

Comparing acceptances onto physics courses and astronomy-related courses (astrophysics, cosmology, space science, astronomy and planetary science) between 2002 and 2010 using the University and College Admissions Service (UCAS) database shows that physics acceptance rose from 3779 to 4495, while acceptances onto astronomy-related courses fell from 879 to 696.<sup>11</sup> Nonetheless it should be noted that a number of physics courses contain a significant proportion of astronomy-related material, and it is likely that potential undergraduates may be attracted to apply for such physics courses because they are inspired by astronomy from an early age. Other indicators, such as the growing popularity of GCSE astronomy<sup>12</sup>, suggest that astronomy continues to be a popular option for young people, and hence the likelihood is that the supply of students into PhD courses will continue and hence the supply of astronomy researchers will remain healthy.

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<sup>11</sup> R. Massey, *Astronomy and Geophysics*, 2011, 3.2, 52.

<sup>12</sup> R. Massey, Private communication.

In 2009, 443 students graduated with at least one third of their time spent studying astronomy compared to 3156 who graduated having spent at least a third of their time studying physics.

The high proportion of academic staff who are professors may have knock on effects in the future in that average astronomy staff salaries are likely to be higher than those in other university cost centres. This may act as a block on promotions in the future (although it should be noted that most universities do not use quotas for promotions) or more likely on recruitment as total salary costs may be high relative to other subjects.

In universities, 45% of staff are fixed-term researchers in astronomy, 46% in solar system science, 36% in solid earth geophysics and 32% in cross disciplinary areas.

Since 1998 the total number of technical staff in universities has fallen from around 210 to 130.

In astronomy 7% of professors are female and 28% of lecturers, in solar system science 11% of professors and 37% of lecturers are female, and in geophysics 8% of professors and 34% of lecturers are female. For comparison, the equivalent figures for physics are 5% of professor and 20% of lecturers are female. There is a higher proportion of female staff in the lower academic grades of astronomy and geophysics than physics, but the proportion of female professors is comparable with that in physics which suggests that female staff progress to higher grades more in physics than in astronomy or geophysics.

The high proportion of staff at professorial grades in astronomy and geophysics should also be considered: this indicates that female staff are concentrated in the lower academic grades to a greater extent in astronomy and geophysics than in most subjects.

In astronomy and solar system science the medium ages for each grade are: 30-34 years for fixed-term and permanent research staff, 35-39 years for lecturers, 40-44 years for senior lecturers/readers, and 55-59 years for professors. The age profile of astronomy and solar system science staff is characterised by having a peak at 40-44 years of age, perhaps reflecting an increase in the number of posts over the last decade. The overall age profile looks relatively healthy with the supply of potential new staff being more than enough to cover retiring staff over the next few years.

The proportion of female staff falls with age which to some extent underlines the point that women are less likely to remain in research careers than men.

The total number of research students is 1232, a significant increase since 1998 and their distribution between the broad research areas is in line with the numbers of academic staff. 70% of research students are full-time and domiciled in the UK. Only 3% of students are studying part-time. The proportion of women among non-UK domiciled students (39%) is higher than that among UK-domiciled students (32%).

The headcount of the astronomy research community (here a combination of the astronomy and solar system science research areas) under consideration in 2010 was 2060.2. The

geophysics community was 357.2 and 203.8 people were identified as being in cross disciplinary areas.

Overall the astronomy community has grown slightly since 1998 and the balance between staff based in research establishments and universities has changed with more staff now working in universities than in 1998.

Among fixed-term researchers in astronomy and geophysics who left their roles for known destinations, 86% moved on to new roles within academia or research institutes while only 8% moved to roles in industry, which suggests that fixed-term staff are very much committed to academic careers, and that there are posts available for them to take up both in the UK and abroad. Over 90% of permanent staff leaving for new roles remained in academia or a research establishment.

## 5.2 Individual Questionnaires

Analysis of the data provided by individuals completing the on line questionnaire yielded detailed information on the demographics of the astronomy and geophysics communities.

The analysis of data relating to permanent staff shows that:

- 78% of permanent staff are British, 12% are from other European countries, 2% are from the USA, and 7% are from other countries
- 95% of permanent staff specified their ethnicity as White. When only British respondents are considered, 97% are White
- Among permanent staff 25.8% of females and 9.2% of males work part-time.
- All grades of academic staff spend between 35 and 39% of their time on research activities. Lecturers, senior lecturers and readers spend more time on undergraduate teaching (about 30%) than professors (19%), but all staff spend around 9% of their time on postgraduate teaching.

Analysis of data relating to postdoctoral research associates show that:

- 49% of postdoctoral research associates had completed their PhD within the last 4 years, and 61% with the last 5 years.
- Overall 61% of postdoctoral research associates are British and of these, 97% of those who indicated their ethnicity are White. 25% of the sample have other European Union nationalities and like the British sample, 96% of those who indicated their ethnicity are White. Only 10% of the sample indicated that they hold citizenship from outside the European Union or the United States
- On average postdoctoral research associates spend 82% of their time on research activities which is more than double the proportion of time spent by permanent academic staff.

For postgraduate research students:

- Overall 68% of postgraduate research students are British, 16% are from elsewhere in the European Union, and 2% are from the USA.
- The majority of British students (66%) receive funding from the STFC.

Considering research interests, 64% of permanent staff respondents indicated that they have research interests in an Astronomy research area with 60% of the overall sample indicating an interest in Astronomy and/or Astrophysics and 9% indicating an interest in Particle Astrophysics, 29% indicated an interest in some aspects of Solar System Science, and 15% indicated an interest in Geophysics.

65% of postdoctoral research associates indicated that they have interests in some aspect of *Astronomy*, 27% indicated an interest in some aspects of *Solar System Science*, and 6% indicated an interest in *Geophysics*.

Combined data for permanent staff and postdoctoral research associates for the proportion of total effort expended on each general research activity shows that 32% of effort is expended on *Theory and numerical modelling* and 35% on *Data analysis*, 11% on *Observation/Data Collection*, 12% on *Data reduction*, and 7% on *Instrumentation*, 2% on *Facility operation and maintenance* and 2% on *Other* activities. Activities are split 54%, 34% and 13% between *Ground-based*, *Space* and *Other* areas respectively

There has been relatively little change in the proportions of effort expended on facilities at different wavelengths between 1998 and 2010 except at X-ray wavelengths where the proportion of effort has fallen from 20% to 10% and in the IR region where the proportion has increased from 17% to 24%.

## Appendix A: Research interests of the astronomy and geophysics communities

The tables and charts below show a count of the popularity of each research area. Respondents were asked to indicate up to 5 research areas across the broad areas of *astronomy (including particle astrophysics)*, *solar system science (including the Earth as a planet)*, and *solid Earth geophysics*. Respondents were also offered some additional broad categories to be used when the other more specific categories were not appropriate.

In addition, respondents who indicated research interest in *Stars, Galaxies/Extragalactic, Cosmology*, or a group of categories related to *planetary science* were asked to provide more details of their interests. The charts record a head count of the number of people who indicated an interest in each area rather than giving effort in terms of full-time equivalents. The charts show the relative popularity of each research area and as such give only a crude indication of the relative research effort.

Tables are presented for all personnel and then charts are presented for all personnel, and then separately for permanent staff, postdoctoral research associates, and finally for postgraduate research students.

**Table A1:** Popularity of research sub-fields in astronomy

Research Area	Count of research interests				Relative popularity of all research areas	Relative popularity of research areas in astronomy
	Permanent Staff	PDRs	Research Students	Total		
AA Historical and Educational research	10	1	2	13	0.6%	1.0%
AB Positional astronomy/Celestial mechanics	6	5	7	18	0.8%	1.3%
AC* Stars	106	46	45	197	8.3%	14.8%
AD Interstellar matter	45	12	16	73	3.1%	5.5%
AE Radio, sub millimetre, infrared sources or background	63	28	31	122	5.2%	9.1%
AF UV/X-ray sources or background	41	24	21	86	3.6%	6.4%
AG Gamma-ray sources or background	27	8	7	42	1.8%	3.1%
AH Cosmic rays	13	3	4	20	0.8%	1.5%
AI Particle astrophysics	22	8	6	36	1.5%	2.7%
AJ Gravitational waves	16	11	17	44	1.9%	3.3%
AK* Galaxies/Extragalactic	118	66	78	262	11.1%	19.6%
AL* Cosmology	70	44	49	163	6.9%	12.2%
AM Databases (incl Virtual Observatories)	26	11	7	44	1.9%	3.3%
AN Physical data and processes	14	10	15	39	1.7%	2.9%
AO Site testing — astronomical sites	2	2	7	11	0.5%	0.8%
AP Circumstellar matter, debris disks, exoplanets	44	16	19	79	3.3%	5.9%
CB Cross Discipline — Internal magnetic dynamos in stars and planets	8	4	1	13	0.6%	1.0%
CC Cross Discipline — Helioseismology/Asteroseismology	7	1	5	13	0.6%	1.0%
CE Cross Discipline — Plasma physics (incl space, solar, astrophysical and laboratory)	13	5	4	22	0.9%	1.6%
Other astronomy area	9	7	21	37	1.6%	2.8%

**Table A2:** Popularity of sub-fields in stellar research

Research Area	Count of research interests				Relative popularity of areas in stellar research
	Permanent Staff	PDRs	Research Students	Total	
1 Binaries	46	19	20	85	19.9%
2 Interiors — Structure	13	5	5	23	5.4%
3 Atmospheres	28	6	5	39	9.1%
4 Formation and Evolution	48	18	19	85	19.9%
5 Pulsars	10	4	8	22	5.2%
6 Supernovae	28	7	9	44	10.3%
7 Planetary Nebulae	13	2	1	16	3.7%
8 Planetary Systems	23	7	9	39	9.1%
9 Variable (Pulsating/Eruptive)	36	10	8	54	12.6%
10 Other	8	7	5	20	4.7%

**Table A3:** Popularity of sub-fields in galactic/extragalactic research

Research Area	Count of research interests				Relative popularity of areas in extragalactic research
	Permanent Staff	PDRs	Research Students	Total	
1 Active Galaxies	59	22	36	117	18.3%
2 Clusters	42	22	25	89	13.9%
3 Normal Galaxies	66	27	21	114	17.8%
4 Quasars	38	11	21	70	11.0%
5 Formation and Evolution	71	46	52	169	26.4%
6 Interactions	29	9	21	59	9.2%
7 Other	9	4	8	21	3.3%

**Table A4:** Popularity of sub-fields in cosmology research

Research Area	Count of research interests				Relative popularity of areas in cosmology research
	Permanent Staff	PDRs	Research Students	Total	
1 Cosmic Microwave Background	19	8	10	37	12.1%
2 Relativity	11	5	5	21	6.9%
3 Dark Matter	31	19	28	78	25.6%
4 Gravitational Lenses	20	10	11	41	13.4%
5 Large Scale Structure	42	28	30	100	32.8%
6 Other	11	6	11	28	9.2%

**Table A5:** Popularity of research sub-fields in solar system science

Research Area	Count of research interests				Relative popularity of all research areas	Relative popularity of research areas in solar system science
	Permanent Staff	PDRs	Research Students	Total		
SA Solar System — origin/evolution	19	4	8	31	1.3%	5.9%
SB Meteorites/Comets	20	2	5	27	1.1%	5.1%
SC Solar studies	27	12	9	48	2.0%	9.1%
SD Heliospheric studies	14	8	2	24	1.0%	4.5%
SE* Magnetosphere(s) (Induced Magnetospheres, Cometary Plasmas)	25	17	13	55	2.3%	10.4%
SF* Ionosphere/Thermosphere (incl radio propagation)	20	10	3	33	1.4%	6.2%
SG* Planetary atmospheres	12	15	15	42	1.8%	7.9%
SH* Planetary surface features	16	1	13	30	1.3%	5.7%
SI* Planetary sub-surface (incl search for water)	7	1	10	18	0.8%	3.4%
SJ* Planetary interiors	11	3	6	20	0.8%	3.8%
SK* Exobiology	13	2	6	21	0.9%	4.0%
SL Earth — Middle atmosphere and climate	13	11	4	28	1.2%	5.3%
SM Earth - Lower atmosphere (incl Oceanography)	9	9	5	23	1.0%	4.3%
CA Cross Discipline — Earth and planetary atmospheres	10	9	4	23	1.0%	4.3%
CB Cross Discipline — Internal magnetic dynamos in stars and planets	7	2	2	11	0.5%	2.1%
CC Cross Discipline — Helioseismology/Asteroseismology	5	1	1	7	0.3%	1.3%
CD Cross Discipline — Sun-climate studies	9	5	1	15	0.6%	2.8%
CE Cross Discipline — Plasma physics (incl space, solar, astrophysical and laboratory)	28	14	9	51	2.2%	9.6%
Other solar system science area	13	6	3	22	0.9%	4.2%

**Table A6:** Popularity of sub-fields in planetary research

Research Area	Count of research interests				Relative popularity of areas in planetary research
	Permanent Staff	PDRs	Research Students	Total	
1 Mercury	14	2	3	19	7.4%
2 Venus	14	4	7	25	9.8%
3 Earth	39	17	17	73	28.5%
4 Mars	24	9	16	49	19.1%
5 Gas Giants	29	12	6	47	18.4%
6 Titan	13	4	2	19	7.4%
7 Other	12	5	7	24	9.4%

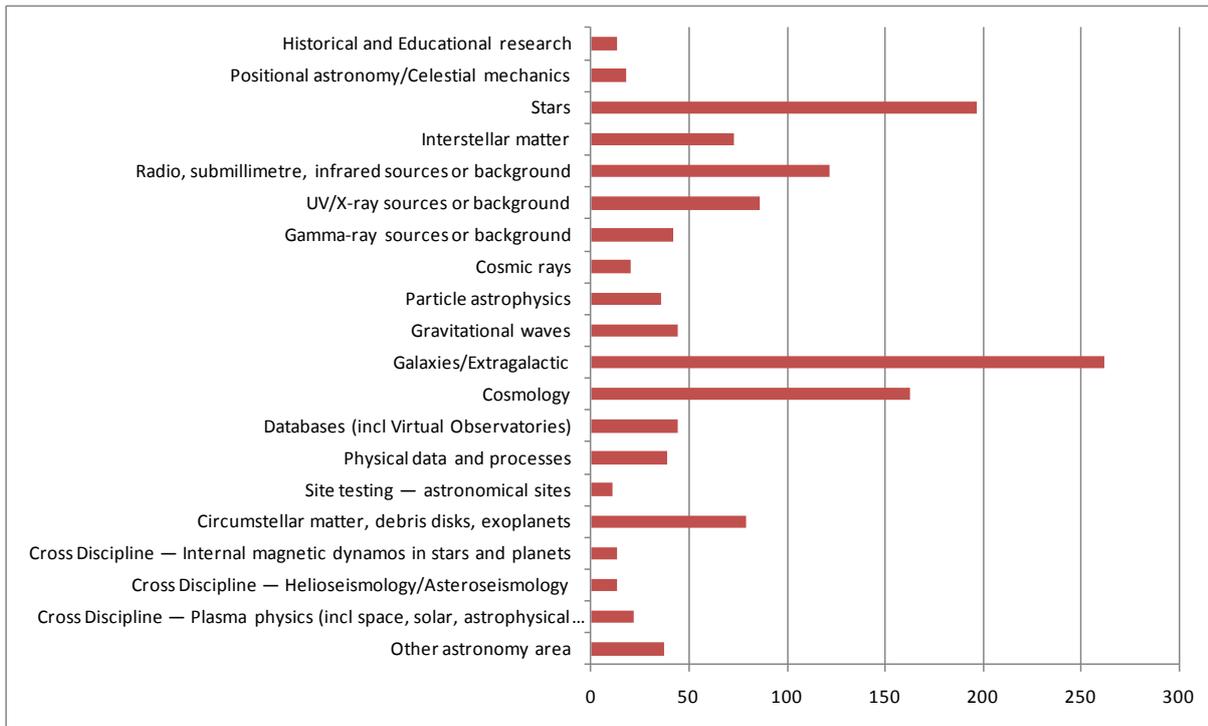
**Table A7:** Popularity of research sub-fields in solid earth geophysics

Research Area	Count of research interests				Relative popularity of all research areas	Relative popularity of research areas in geophysics
	Staff	PDRs	Students	Total		
GA Earth Structure	21	2	14	37	1.6%	11.4%
GB Electromagnetics	5	1	3	9	0.4%	2.8%
GC Exploration Geophysics	16	1	5	22	0.9%	6.8%
GD Geodesy and Gravity	12	1	5	18	0.8%	5.5%
GE Geomagnetism and Palaeomagnetism	15	2	4	21	0.9%	6.5%
GF Global Change GH Hydrology	4	3	3	10	0.4%	3.1%
GI Marine Geophysics	12	3	8	23	1.0%	7.1%
GJ Mathematical Geophysics	8	5	7	20	0.8%	6.2%
GK Mineral Physics	6	0	3	9	0.4%	2.8%
GL Oceanography	5	8	4	17	0.7%	5.2%
GM Physical Properties of Rocks	17	3	8	28	1.2%	8.6%
GN Physics of the Earth's Interior	15	4	7	26	1.1%	8.0%
GN Seismology	21	7	8	36	1.5%	11.1%
GO Tectonophysics	21	2	10	33	1.4%	10.2%
GP Site testing	2	0	0	2	0.1%	0.6%
Other solid earth geophysics area (please specify)	7	2	5	14	0.6%	4.3%

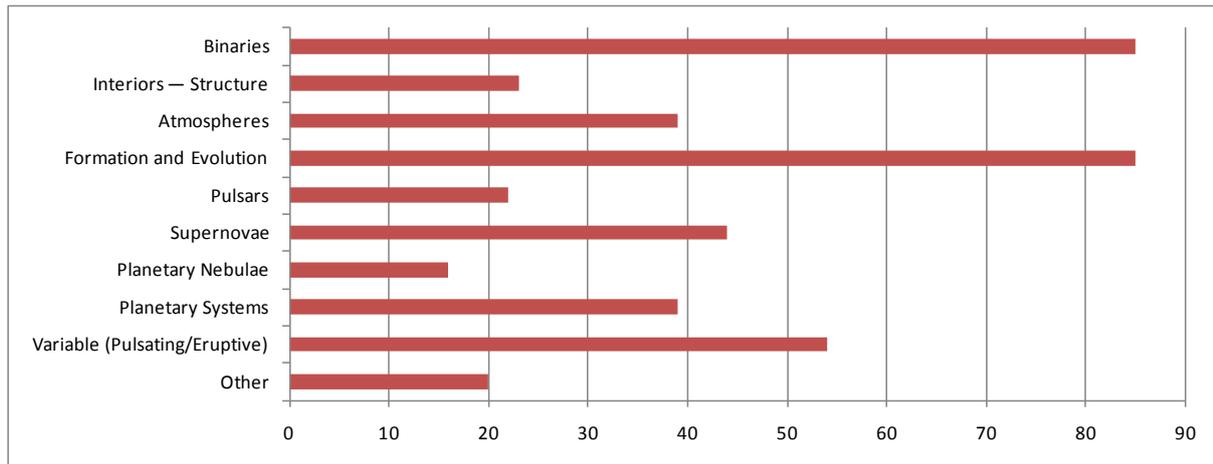
**Table A8:** Popularity of other broad research areas

Research Area	Count of research interests				Relative popularity of all research areas
	Permanent Staff	PDRs	Research Students	Total	
XA Theoretical Astrophysics	26	17	10	53	2.2%
XB Theoretical Solar System work	7	2	0	9	0.4%
XC Theoretical Geophysics	1	1	2	4	0.2%
Y Instruments and Techniques	43	19	13	75	3.2%
Z Spacecraft	12	10	3	25	1.1%
+ Other - please specify	5	2	2	9	0.4%
XA Theoretical Astrophysics	26	17	10	53	2.2%

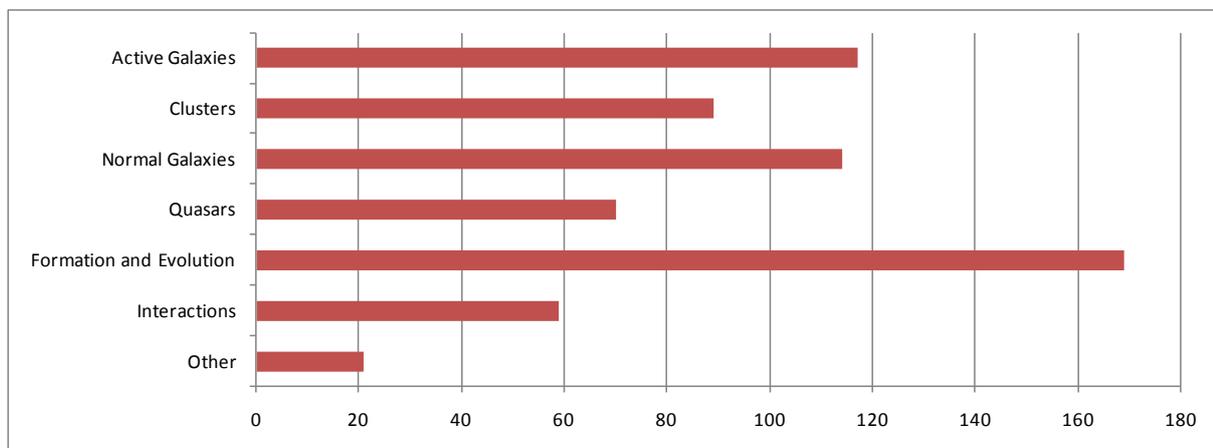
**A1 Research interests of all personnel**



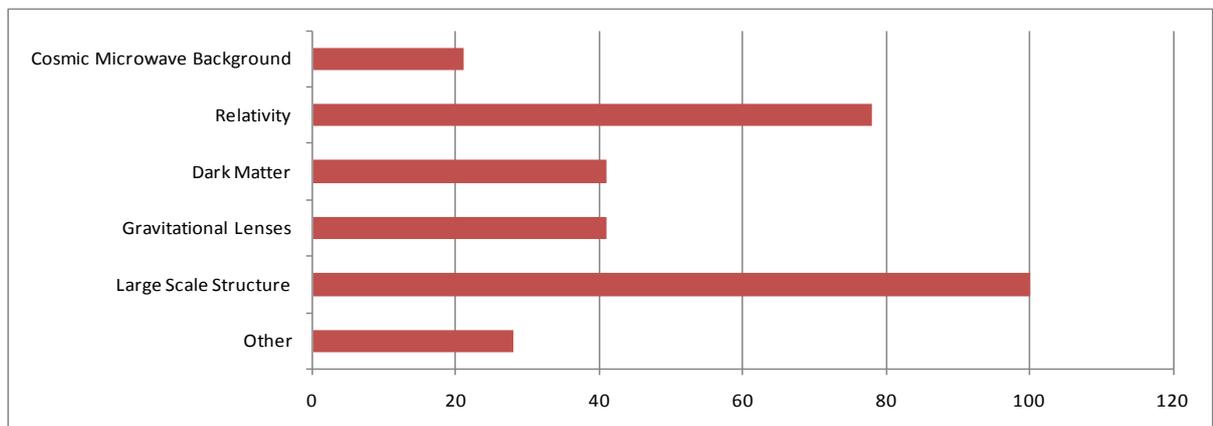
**Figure A1:** Breakdown of interest in Astronomy research



**Figure A2:** Breakdown of interest in stellar research



**Figure A3:** Breakdown of total effort in extragalactic research



**Figure A4:** Breakdown of interest in cosmology research

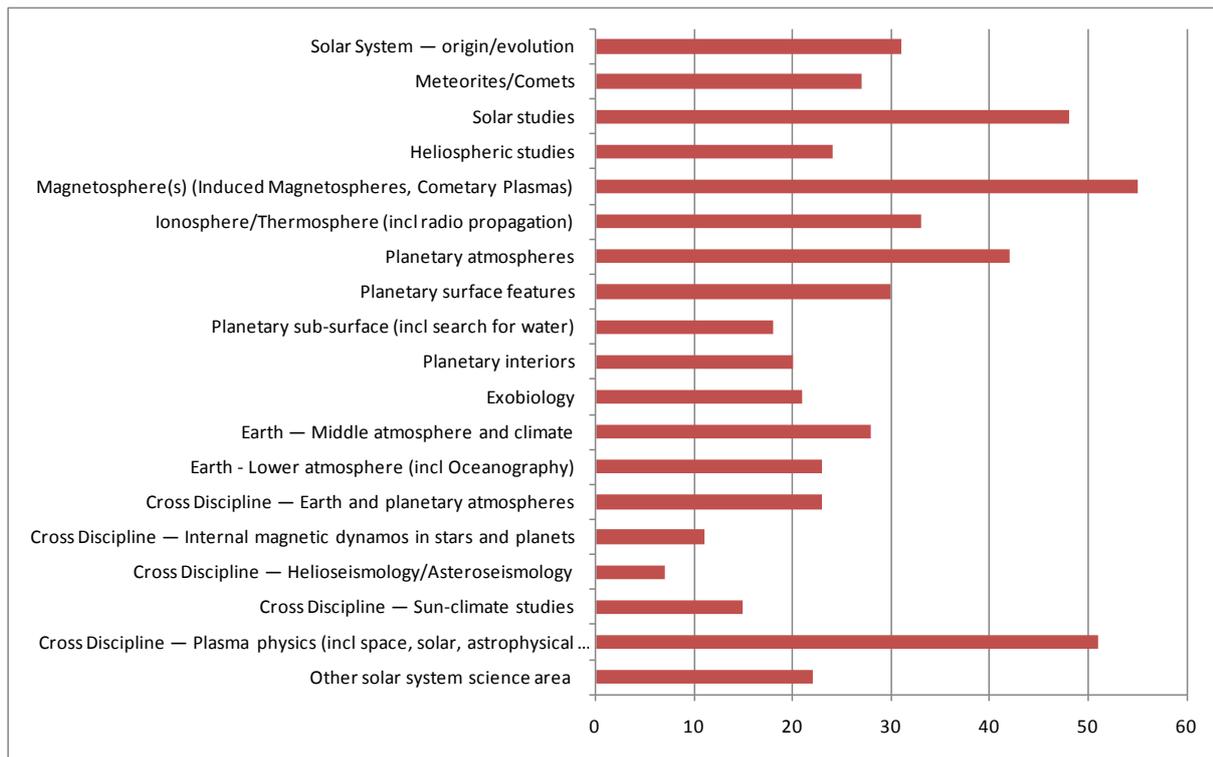


Figure A5: Breakdown of interest in solar system science

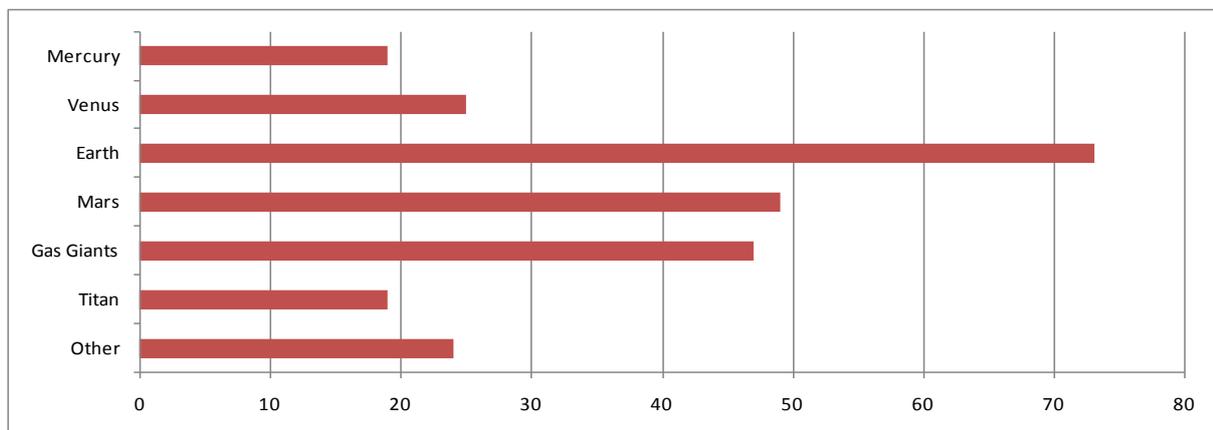
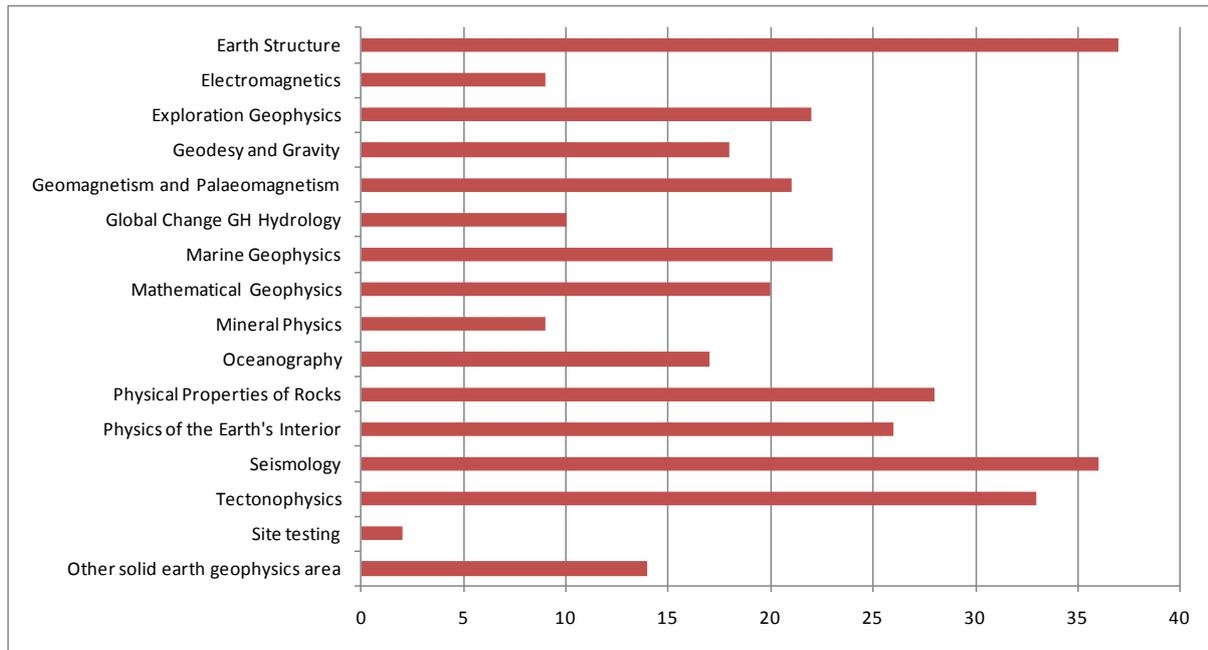
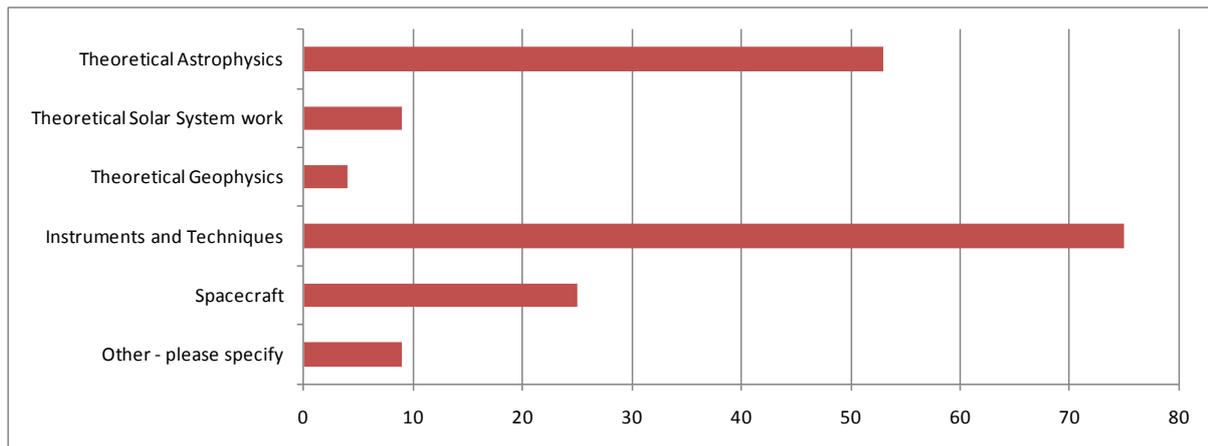


Figure A6: Breakdown of interest in planetary research

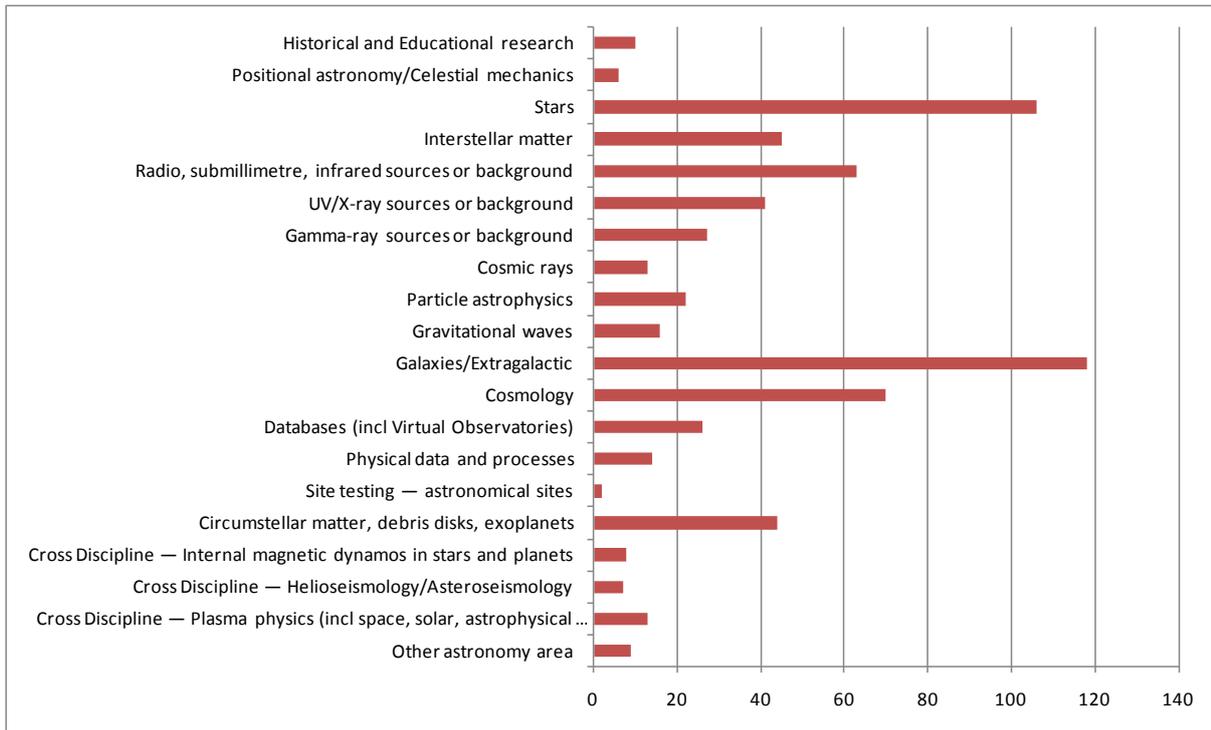


**Figure A7:** Breakdown of interest in solid Earth geophysics research

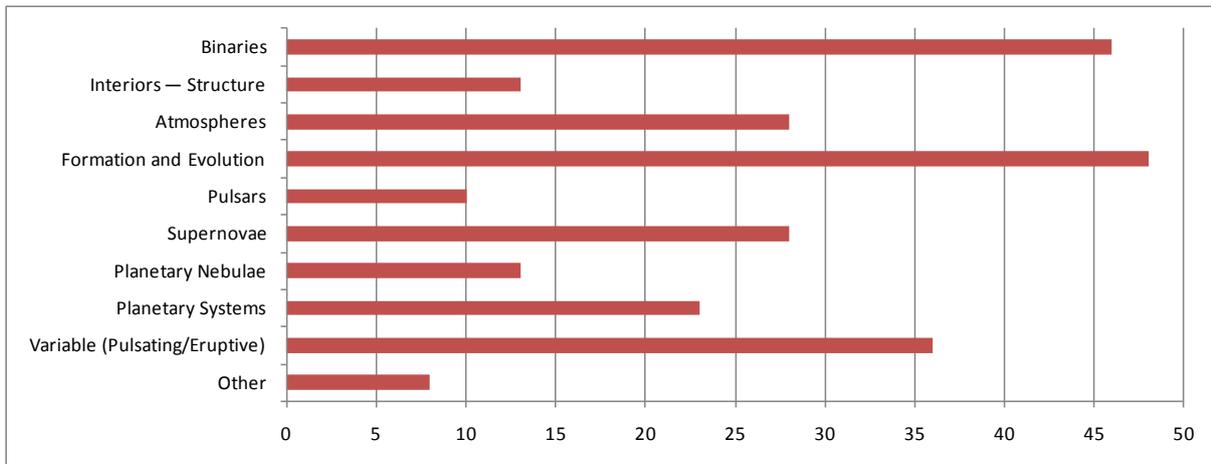


**Figure A8:** Breakdown of interest in other broad research areas

**A2 Research interests of permanent staff**



**Figure A9:** Breakdown of the interest of permanent staff in astronomy research



**Figure A10:** Breakdown of the interest of permanent staff in stellar research

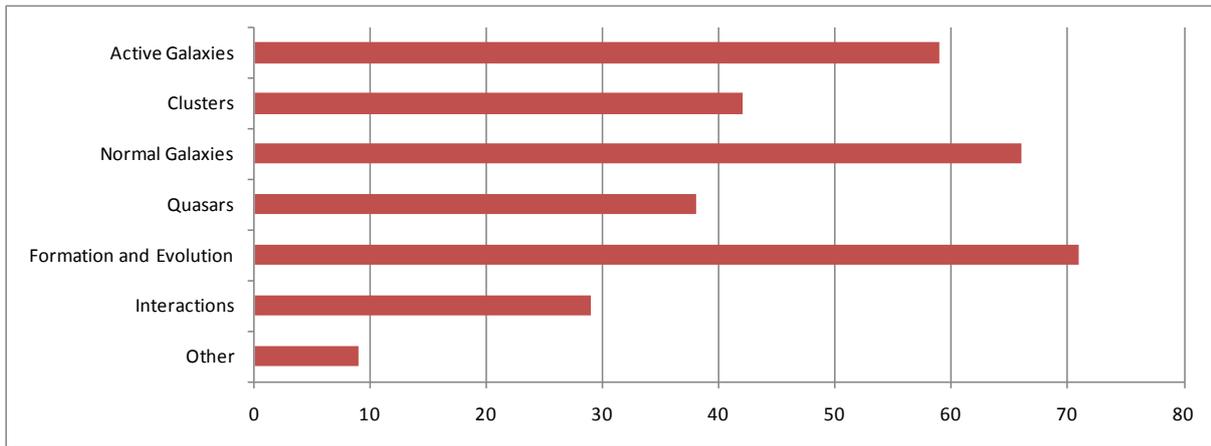


Figure A11: Breakdown of the interest of permanent staff in extragalactic research

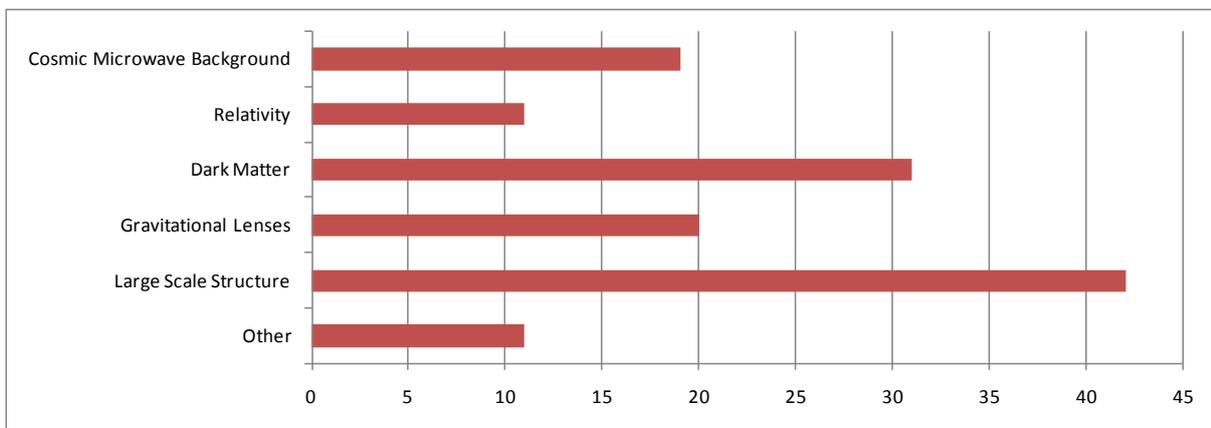


Figure A12: Breakdown of the interest of permanent staff in cosmology research

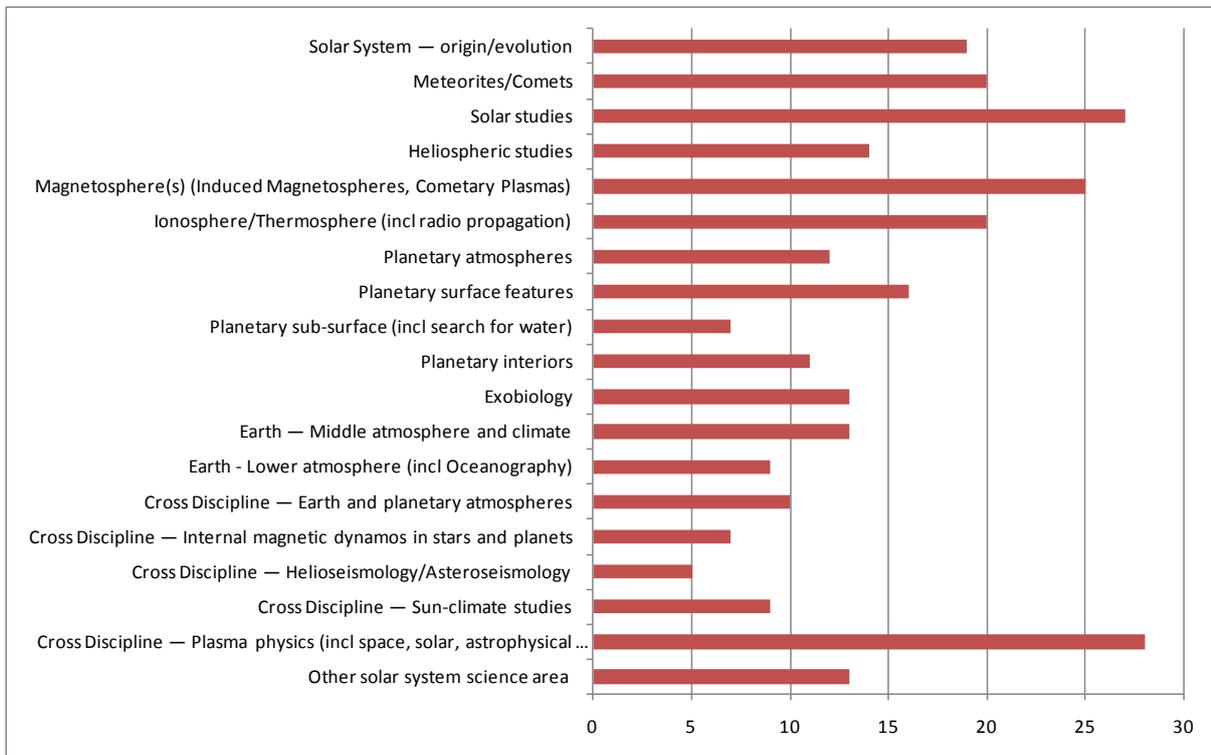
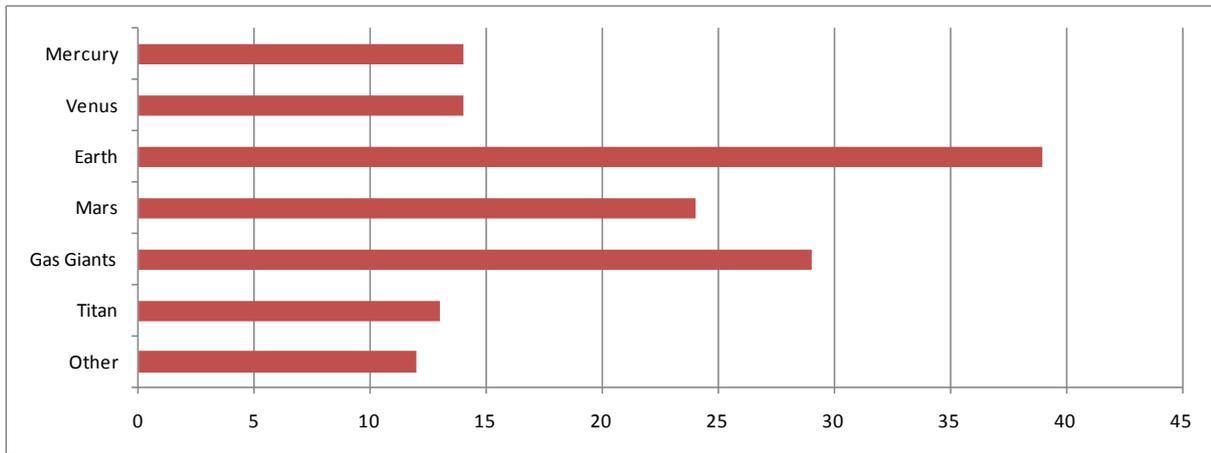
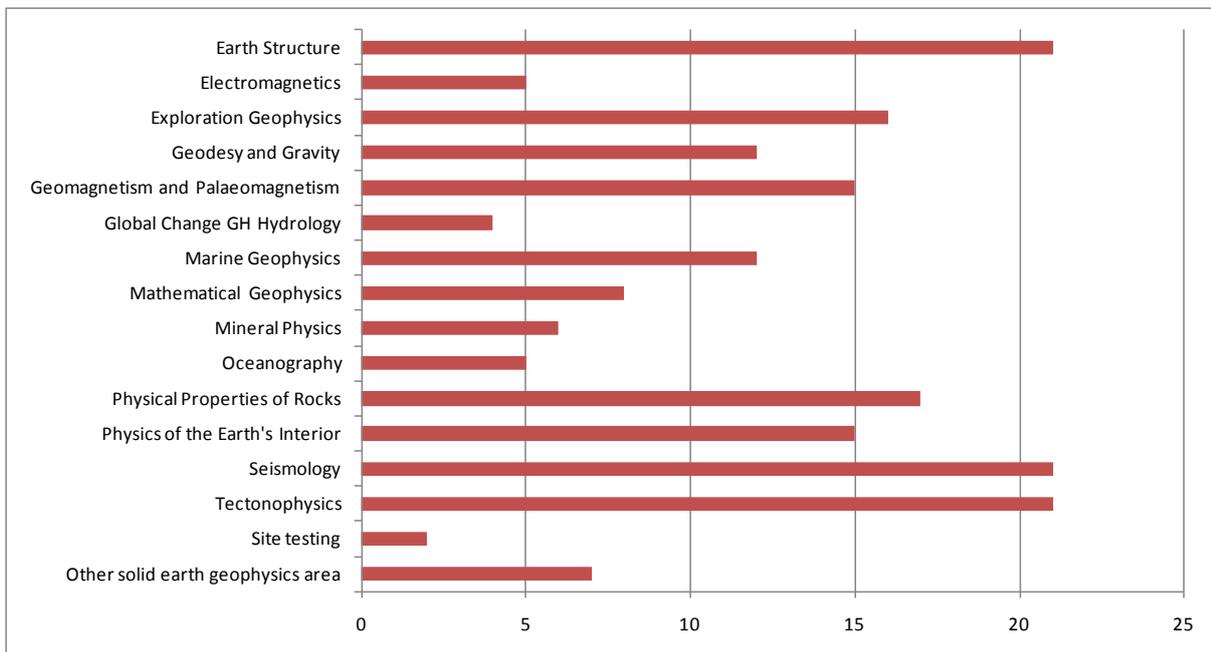


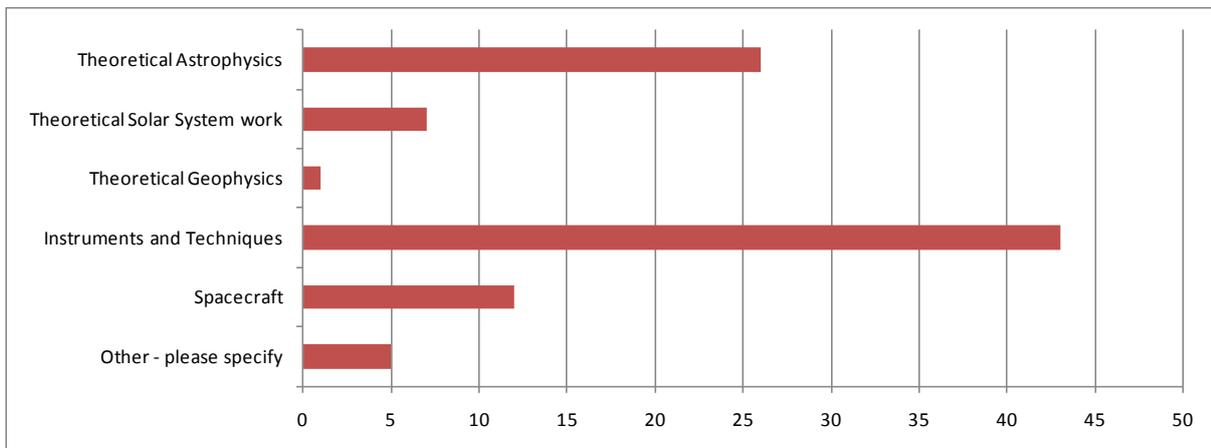
Figure A13: Breakdown of the interest of permanent staff in solar system science



**Figure A14:** Breakdown of the interest of permanent staff in planetary research

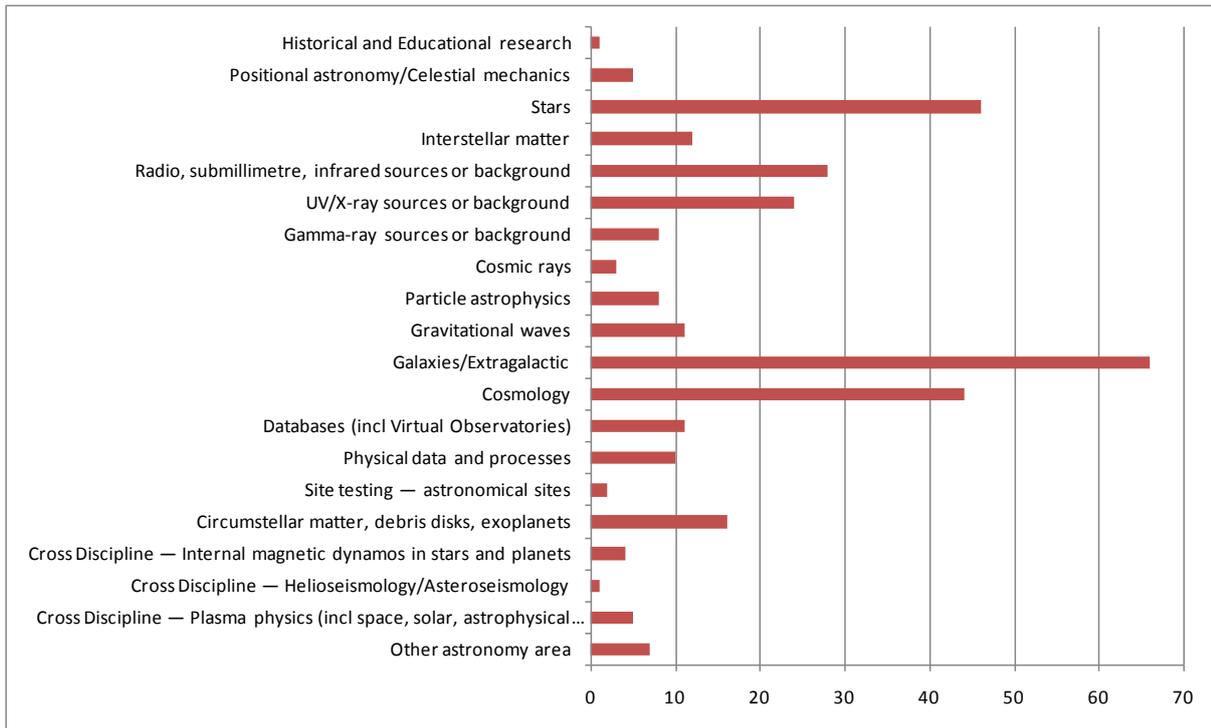


**Figure A15:** Breakdown of the interest of permanent staff in solid Earth geophysics research

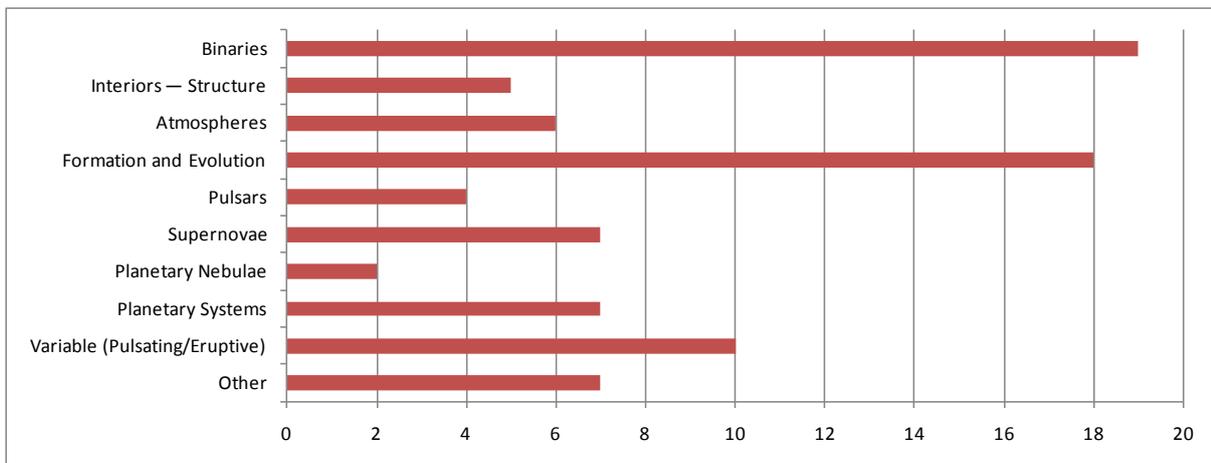


**Figure A16:** Breakdown of the interest of permanent staff in other broad research areas

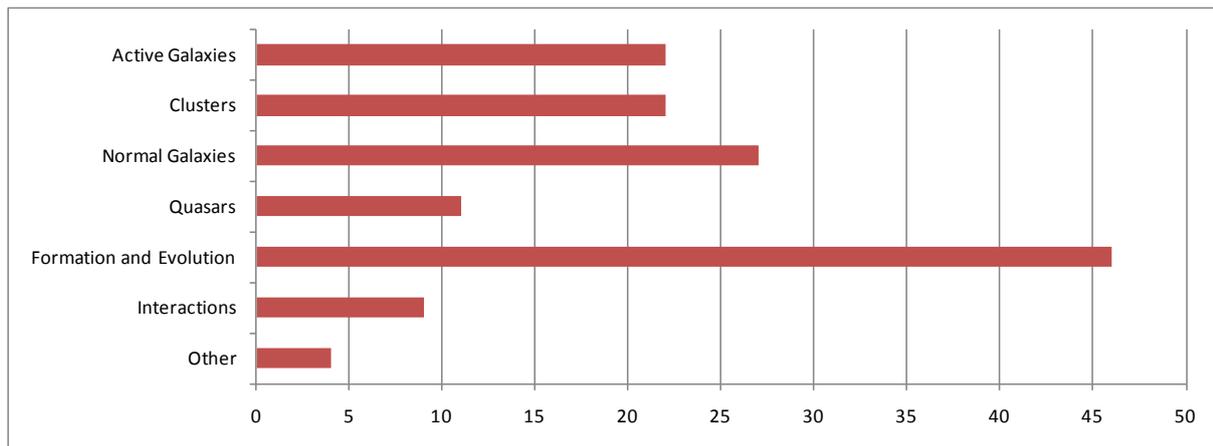
**A3 Research interests of postdoctoral research associates**



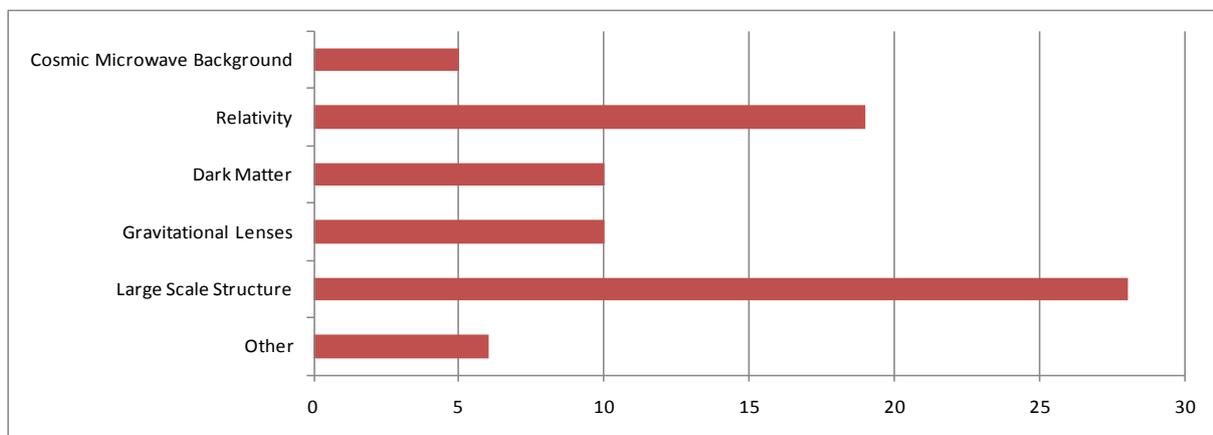
**Figure A17:** Breakdown of the interest of postdoctoral research associates in astronomy research



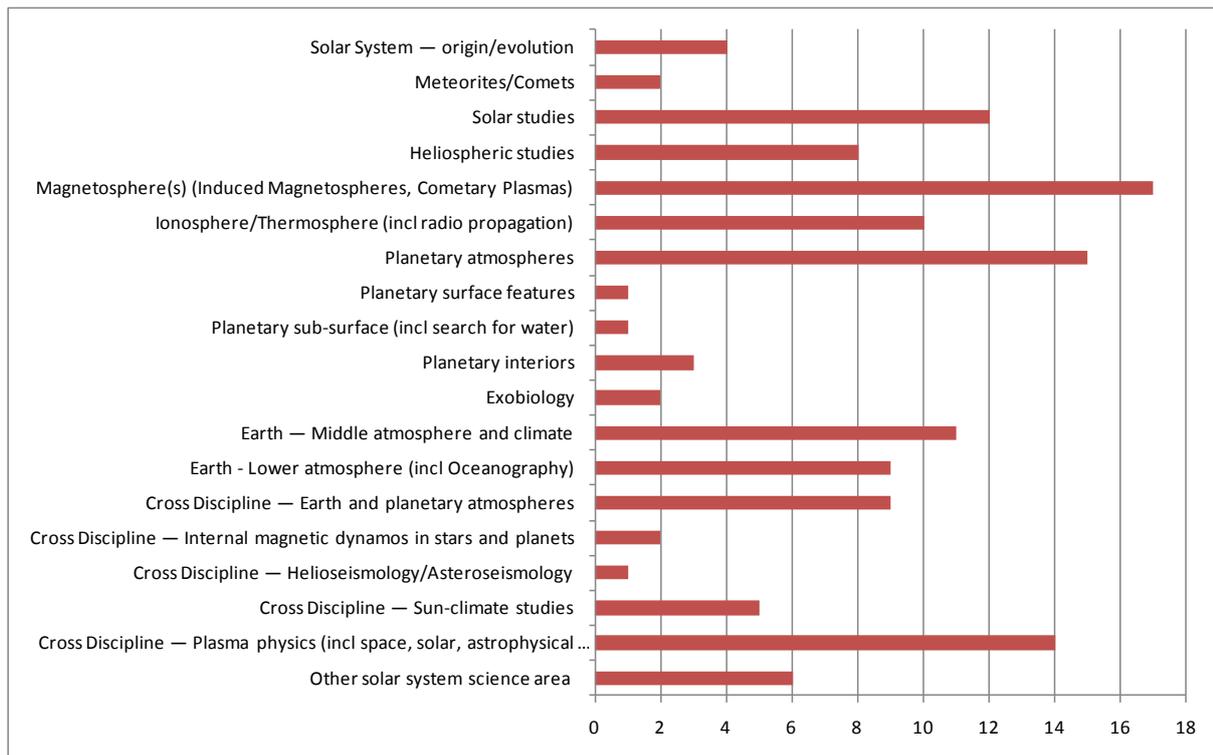
**Figure A18:** Breakdown of the interest of postdoctoral research associates in stellar research



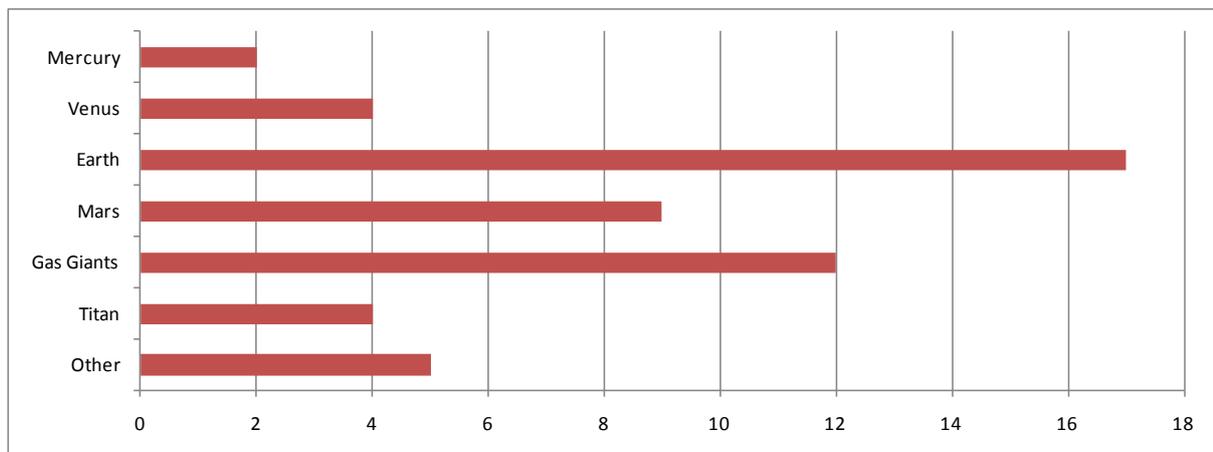
**Figure A19:** Breakdown of the interest of postdoctoral research associates in extragalactic research



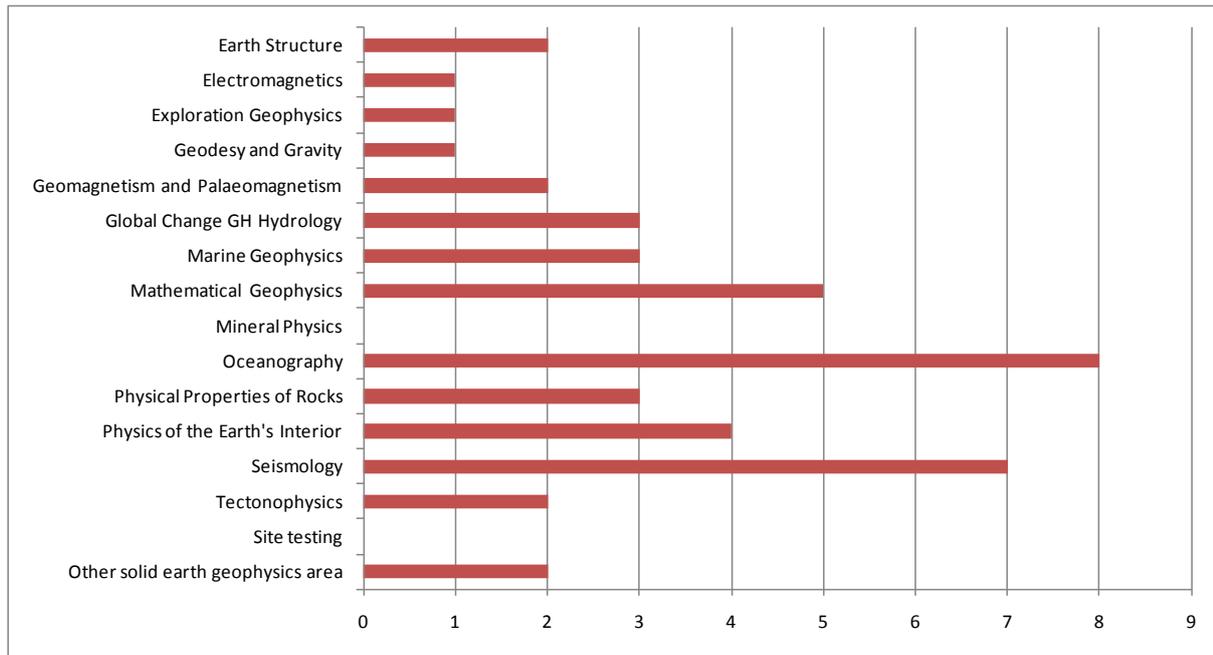
**Figure A20:** Breakdown of the interest of postdoctoral research associates in cosmology research



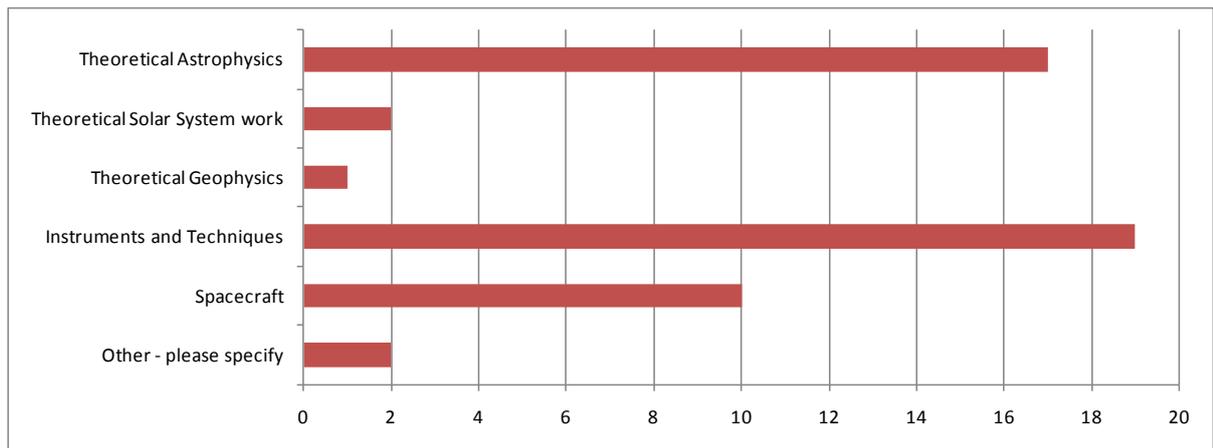
**Figure A21:** Breakdown of the interest of postdoctoral research associates in solar system science



**Figure A22:** Breakdown of the interest of postdoctoral research associates in planetary research

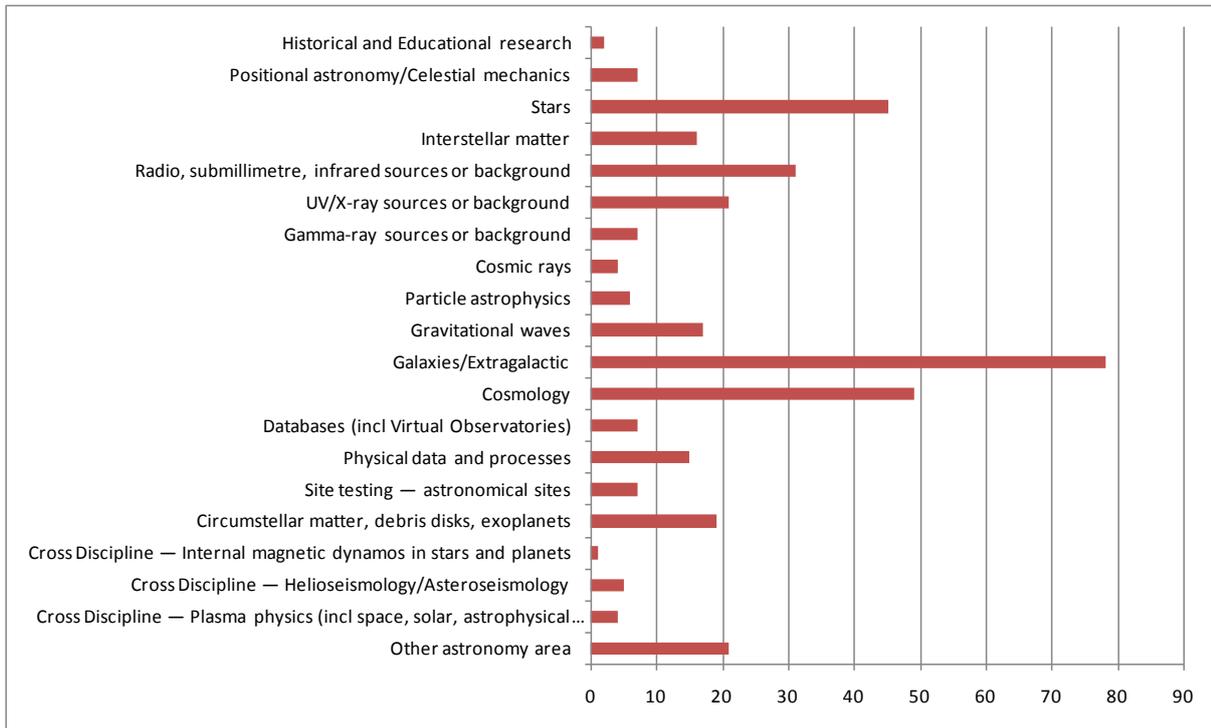


**Figure A23:** Breakdown of the interest of postdoctoral research associates in solid Earth geophysics research

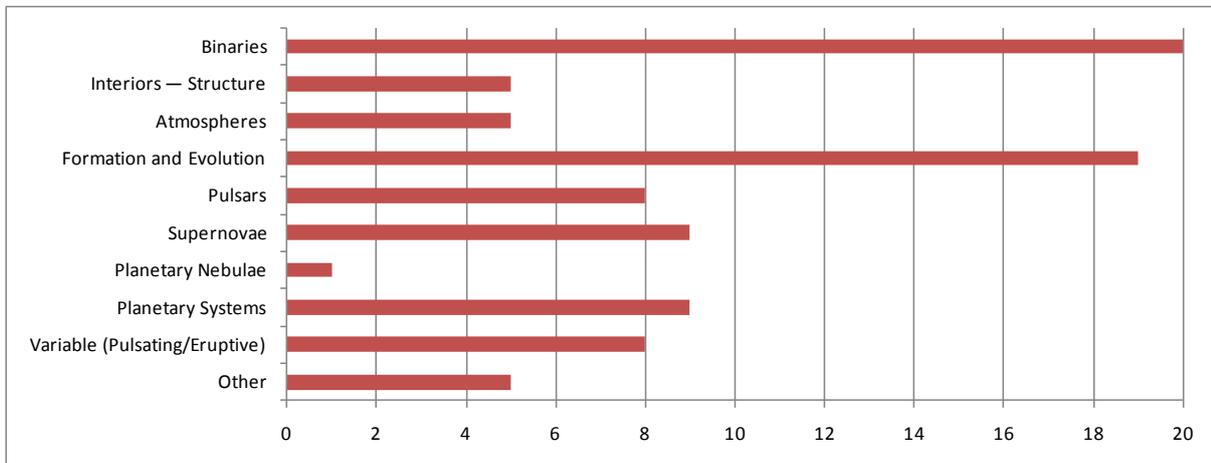


**Figure A24:** Breakdown of the interest of postdoctoral research associates in other broad research areas

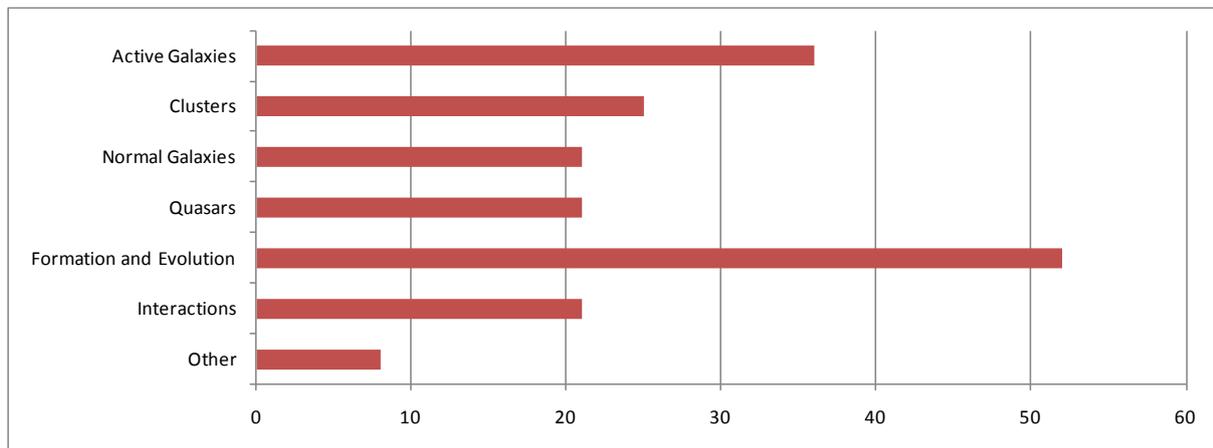
**A3 Research interests of Postgraduate Students**



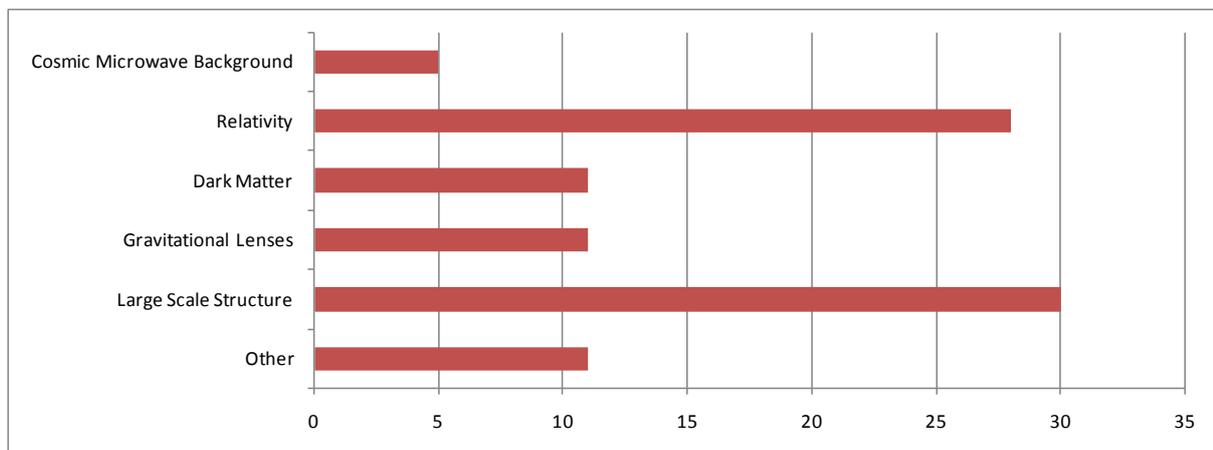
**Figure A17:** Breakdown of the interest of postdoctoral research associates in astronomy research



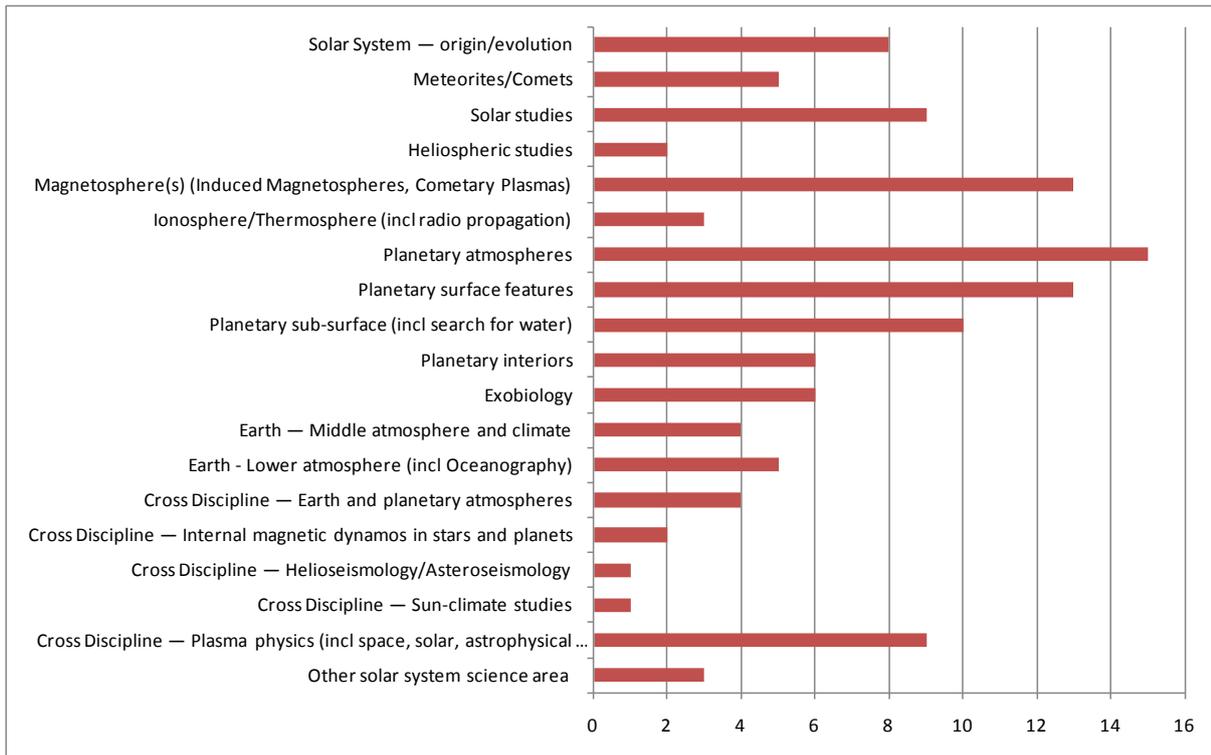
**Figure A18:** Breakdown of the interest of postdoctoral research associates in stellar research



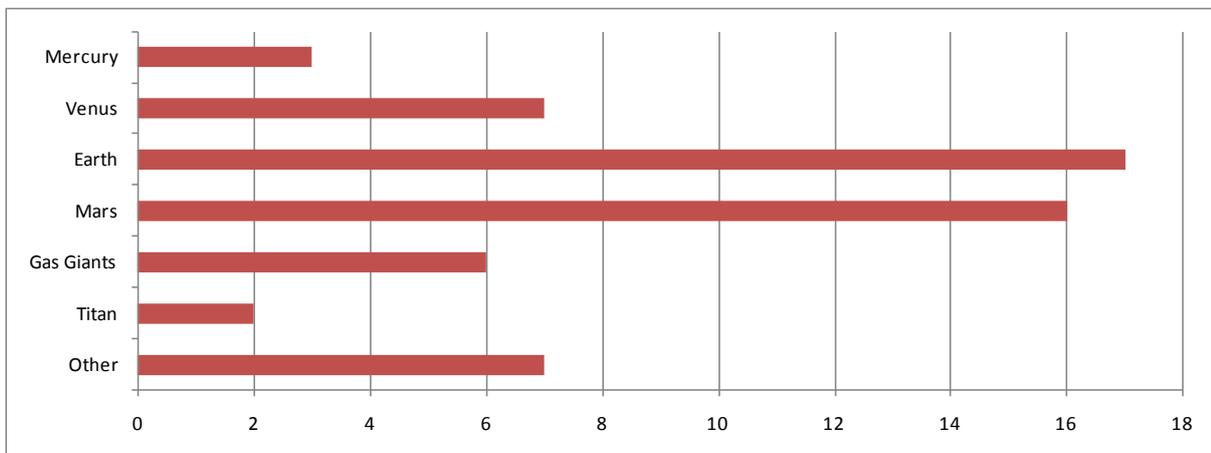
**Figure A19:** Breakdown of the interest of postdoctoral research associates in extragalactic research



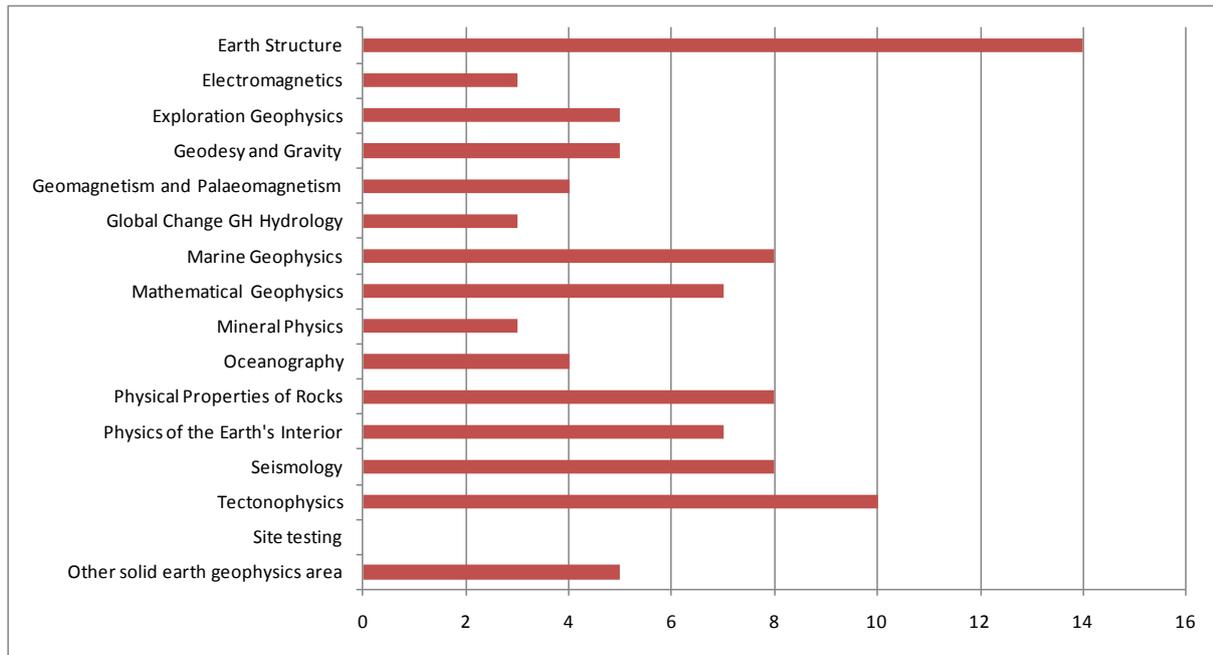
**Figure A20:** Breakdown of the interest of postdoctoral research associates in cosmology research



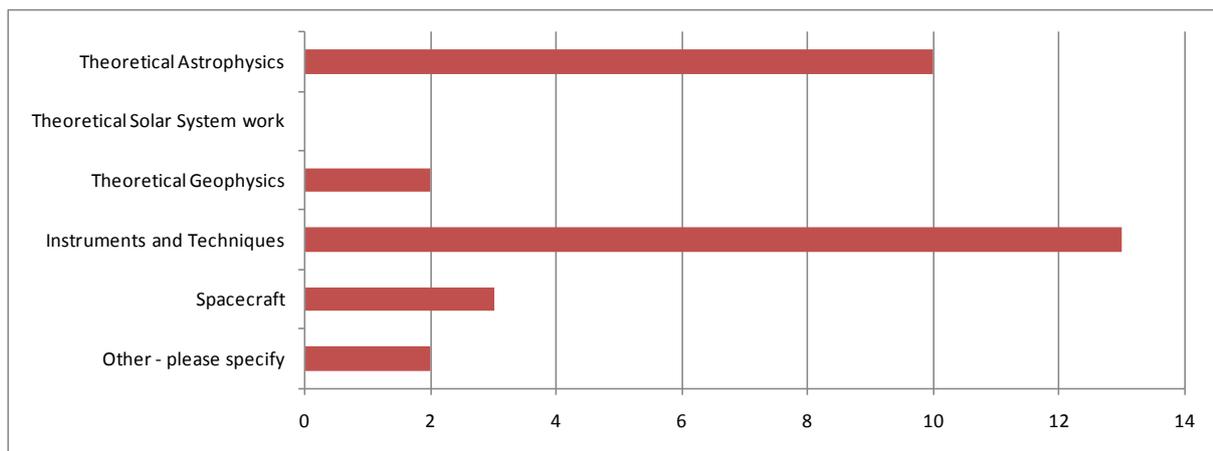
**Figure A21:** Breakdown of the interest of postdoctoral research associates in solar system science



**Figure A22:** Breakdown of the interest of postdoctoral research associates in planetary research



**Figure A23:** Breakdown of the interest of postdoctoral research associates in solid Earth geophysics research



**Figure A24:** Breakdown of the interest of postdoctoral research associates in other broad research areas

## Appendix B: Departments and Establishments that participated

The following university department and research groups contributed to the 2010 survey. Although departments marked with an asterisk did not respond to the survey, information for the was reconstructed from the departments' websites:

University of Aberdeen, Institute of Mathematics  
Aberystwyth University, Institute of Mathematics and Physics\*  
University of Bath, Department of Physics\*  
University of Birmingham, School of Physics and Astronomy  
University of Birmingham, School of Geography, Earth and Environmental Sciences\*  
University of Bradford, Department of Cybernetics, Internet and Virtual Systems\*  
University of Cambridge, Department of Physics  
University of Cambridge, Department of Applied Mathematics and Theoretical Physics (DAMTP)\*  
University of Cambridge, Institute of Astronomy  
University of Cambridge, Department of Earth Science  
Cardiff University, School of Earth and Ocean Sciences\*  
Cardiff University, School of Mathematics  
Cardiff University, School of Physics and Astronomy  
University of Central Lancashire, Jeremiah Horrocks Institute\*  
University of Dundee, Division of Electronic Engineering, Physics and Renewable Energy\*  
University of Dundee, School of Social & Environmental Sciences\*  
University of Dundee, School of Social and Environmental Sciences\*  
University of Dundee, Division of Mathematics\*  
Durham University, Department of Earth Sciences\*  
Durham University, Department of Physics  
University of East Anglia, School of Environmental Sciences\*  
University of Edinburgh, Institute for Astronomy  
University of Edinburgh, School of Geoscience  
Exeter University, School of Physics\*  
University of Glasgow, School of Physics and Astronomy  
University of Hertfordshire, School of Physics, Astronomy and Mathematics  
Imperial College London, Department of Physics  
Keele University, Physics & Astrophysics  
Kings College London, Department of Physics\*  
Lancaster University, Department of Physics  
The Lancaster Environment Centre  
University of Leeds, School of Physics and Astronomy  
University of Leeds, Department of Applied Mathematics  
University of Leeds, School of Earth and Environment  
University of Leicester, Department of Physics and Astronomy  
University of Leicester, Department of Geology  
University of Liverpool, Department of Earth Sciences\*  
University of Liverpool, Department of Physics\*  
University of Liverpool, Department of Mathematical Sciences  
Liverpool John Moores University, Astrophysics Research Institute

Loughborough University, Department of Physics\*  
University of Manchester, School of Physics and Astronomy\*  
University of Manchester, School of Earth, Atmospheric and Environmental Sciences  
Newcastle University, School of Mathematics & Statistics  
University of Nottingham, School of Chemistry  
University of Nottingham, School of Physics & Astronomy  
Nottingham Trent University, Physics\*  
Open University, Earth and Environmental Sciences  
Open University, Department of Physics & Astronomy  
Oxford University, Department of Earth Sciences  
Oxford University, Atmospheric, Oceanic and Planetary Physics  
Oxford University, Astrophysics\*  
Oxford University, Theoretical Physics\*  
University of Portsmouth, Institute of Cosmology and Gravitation  
Queen Mary, University of London, Astronomy Unit  
Queen's University Belfast, School of Mathematics and Physics\*  
University of Reading, School of Mathematical and Physical Sciences  
University of Sheffield, Department of Physics and Astronomy\*  
University of Southampton, School of Physics & Astronomy\*  
National Oceanography Centre, Southampton (NOCS)  
University of Strathclyde, Department of Physics  
University of St Andrews, School of Physics & Astronomy  
University of Sussex, Astronomy Centre  
University College London, Department of Physics and Astronomy  
University College London, Department of Earth Sciences\*  
University College London, Department of Space & Climate Physics (MSSL)  
University of Kent, Astrophysics and Planetary Science  
University of Warwick, Centre for Fusion, Space and Astrophysics

The following research establishments and overseas facilities contributed to the 2010 survey. Although departments marked with an asterisk did not respond to the survey, information for the was reconstructed from the departments' websites:

Armagh Observatory\*  
British Antarctic Survey (BAS)  
British Geological Survey (BGS)  
Rutherford Appleton Laboratory (RAL): Space Science and Technology Department (SSTD)  
Isaac Newton Group of Telescopes

## **Appendix C: The Questionnaire for University Departments and Research Establishments**

### **The Demographics and Research Interests of the UK Astronomy and Geophysics Communities 2010**

The Royal Astronomical Society has carried out a number of surveys to establish staff levels in the UK in astronomy and geophysics. The last such survey was carried out in 2003.

We would be very grateful for your help in completing this year's survey. Our approach is to collect demographic information directly from departments/institutes carrying out research in astronomy, solar system science and solid Earth geophysics. The following pages ask you to provide demographic information on your current staff working in the areas of interest, and to give information on those staff who have left and joined in the last 5 years. Additionally we are asking you to provide information on the research students currently registered.

The second part of our study will comprise a individual questionnaire aimed at collecting more detailed information from all staff (permanent academic, research and technical/support) and research students working in the fields of astronomy, solar system science and solid Earth geophysics. This questionnaire will be available on line and we will be contacting you again in the near future to ask you to distribute the link to this questionnaire to all relevant staff and research students.

We realise that completing the attached questionnaire will take some time, however, the information that we collect will enable us to assess how the make-up of the community has changed over the last few years, and to help us plan for the future and provide information and numbers to aid our policy work.

We have engaged Sean McWhinnie at Oxford Research and Policy to help us with this project.

Please could you return the questionnaire either electronically or in paper form directly to Sean McWhinnie by 30 November 2010. Sean's contact details are:

Sean McWhinnie  
Oxford Research and Policy  
2 Sutton Road  
Milton  
Oxfordshire  
OX14 4ET

Email: [sean@oxfordresearchandpolicy.co.uk](mailto:sean@oxfordresearchandpolicy.co.uk)

Tel: 01235 439188

The results of this questionnaire and the data from the individual questionnaires will be published in non-attributable form with a commentary. Information relating to individuals or specific institutions will be confidential to the RAS and Oxford Research and Policy and will not be released in attributable form without prior permission. It is our intention to use the data only in the way that is declared here. Under the provision of the Data Protection Act, however we ask you to be aware that the information will be held on a computerised database. We will assume that return of the questionnaire indicates your agreement unless you wish to advise us otherwise.

We are in touch with the STFC and with NERC about this survey.

If you have any questions please do not hesitate to contact us, or to contact Sean McWhinnie.

Thank you for your help with this project

Robert Massey

### Profile of Staff in Astronomy, Solar System Science and Solid Earth Geophysics

We would like to know the age and gender of the staff supported by your institution/department in the areas of Astronomy, Solar System Science and Solid Earth Geophysics. More details of what is covered by these broad areas are provided at the end of this questionnaire: some examples of cross disciplinary research areas are listed but in general staff may be entered as cross disciplinary if they spend significant time researching/teaching in more than one broad area,.

The Table below and continued on the next page asks you to list numbers of staff in each of the broad research/teaching categories by age and gender.

	Position/Grade	20-24		25-29		30-34		35-39		40-44		45-49		50-54		55-59		60-64		65-70		70+		Total				
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
<b>Astronomy</b>	Professor																											
	Senior Lecturer/Reader (or equivalent)																											
	Lecturer (or equivalent)																											
	Permanent Research Staff																											
	Fixed-term Research Staff																											
	Permanent Technical/Support Staff																											
	Fixed-Term Technical/Support staff																											
	Long Term Visitors undertaking research																											
	Other Scientific and Technical Staff																											
	<b>Total</b>																											
<b>Solar System Science</b>	Professor																											
	Senior Lecturer/Reader (or equivalent)																											
	Lecturer (or equivalent)																											
	Permanent Research Staff																											
	Fixed-term Research Staff																											
	Permanent Technical/Support Staff																											
	Fixed-Term Technical/Support staff																											
	Long Term Visitors undertaking research																											
	Other Scientific and Technical Staff																											
	<b>Total</b>																											

The Demographics and Research Interests of the UK Astronomy and Geophysics Communities 2010

	Position/Grade	20-24		25-29		30-34		35-39		40-44		45-49		50-54		55-59		60-64		65-70		70+		Total		
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
Solid Earth Geophysics	Professor																									
	Senior Lecturer/Reader (or equivalent)																									
	Lecturer (or equivalent)																									
	Permanent Research Staff																									
	Fixed-term Research Staff																									
	Permanent Technical/Support Staff																									
	Fixed-Term Technical/Support staff																									
	Long Term Visitors undertaking research																									
	Other Scientific and Technical Staff																									
	<b>Total</b>																									
Cross Disciplinary	Professor																									
	Senior Lecturer/Reader (or equivalent)																									
	Lecturer (or equivalent)																									
	Permanent Research Staff																									
	Fixed-term Research Staff																									
	Permanent Technical/Support Staff																									
	Fixed-Term Technical/Support staff																									
	Long Term Visitors undertaking research																									
	Other Scientific and Technical Staff																									
	<b>Total</b>																									

### Turnover of staff in the last 5 years

For each of the broad research/teaching areas please could you indicate the numbers of staff in various categories who have left your institution/department in the last 5 years, and their reasons for leaving (if known).

	Staff Leavers 2006-2010	Reason for leaving																	
		Early Retirement		Normal Retirement		New job in Academia/ a research institute in the UK		New job in Academia/ a research institute abroad		Move to a job in industry		Move to a job outside Scientific Research		End of contract		Death in Service		Unknown	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Astronomy	Permanent Academic Staff																		
	Permanent Research Staff																		
	Fixed-Term Research Staff																		
	Permanent Technical/Support Staff																		
	Fixed-Term Technical/Support staff																		
	Other Scientific and Technical Staff																		
Solar System Science	Permanent Academic Staff																		
	Permanent Research Staff																		
	Fixed-Term Research Staff																		
	Permanent Technical/Support Staff																		
	Fixed-Term Technical/Support staff																		
	Other Scientific and Technical Staff																		
Solid Earth Geophysics	Permanent Academic Staff																		
	Permanent Research Staff																		
	Fixed-Term Research Staff																		
	Permanent Technical/Support Staff																		
	Fixed-Term Technical/Support staff																		
	Other Scientific and Technical Staff																		
Cross Disciplinary	Permanent Academic Staff																		
	Permanent Research Staff																		
	Fixed-Term Research Staff																		
	Permanent Technical/Support Staff																		
	Fixed-Term Technical/Support staff																		
	Other Scientific and Technical Staff																		

The Demographics and Research Interests of the UK Astronomy and Geophysics Communities 2010

Please indicate the number of staff who have joined your department/institution in the last 5 years, indicating the broad area they work in, the category of staff into which they fall, their gender, and the age at which they were appointed. Please include staff who have already left and also include those individuals in the leavers table above.

	Staff Joining 2006-2010	20-24		25-29		30-34		35-39		40-44		45-49		50-54		55-59		60-64		
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
Astronomy	Permanent Academic Staff																			
	Permanent Research Staff																			
	Fixed-Term Research Staff																			
	Permanent Technical/Support Staff																			
	Fixed-Term Technical/Support staff																			
	Other scientific and Technical Staff																			
Solar System Science	Permanent Academic Staff																			
	Permanent Research Staff																			
	Fixed-Term Research Staff																			
	Permanent Technical/Support Staff																			
	Fixed-Term Technical/Support staff																			
	Other scientific and Technical Staff																			
Solid Earth Geophysics	Permanent Academic Staff																			
	Permanent Research Staff																			
	Fixed-Term Research Staff																			
	Permanent Technical/Support Staff																			
	Fixed-Term Technical/Support staff																			
	Other scientific and Technical Staff																			
Cross Disciplinary	Permanent Academic Staff																			
	Permanent Research Staff																			
	Fixed-Term Research Staff																			
	Permanent Technical/Support Staff																			
	Fixed-Term Technical/Support staff																			
	Other scientific and Technical Staff																			

### Postgraduate Research Students

Please indicate the numbers of postgraduate research students in your institute/department indicating what year of research they are in, their broad area of research, and their gender. Please also indicate whether they are full-time or part-time, and for full-time students whether they are UK domiciled or non-UK domiciled.

#### Full-Time, UK Domiciled Post Graduate Students

	1st Year		2nd Year		3rd Year		4th Year		5th Year		Writing Up	
	M	F	M	F	M	F	M	F	M	F	M	F
<b>Astronomy</b>												
<b>Solar System Science</b>												
<b>Solid Earth Geophysics</b>												
<b>Cross Disciplinary</b>												

#### Full-Time, Non-UK Domiciled Post Graduate Students

	1st Year		2nd Year		3rd Year		4th Year		5th Year		Writing Up	
	M	F	M	F	M	F	M	F	M	F	M	F
<b>Astronomy</b>												
<b>Solar System Science</b>												
<b>Solid Earth Geophysics</b>												
<b>Cross Disciplinary</b>												

#### Part-time Students Post Graduate Students (both UK and non-UK Domiciled)

	1st Year		2nd Year		3rd Year		4th Year		5th Year		Writing Up	
	M	F	M	F	M	F	M	F	M	F	M	F
<b>Astronomy</b>												
<b>Solar System Science</b>												
<b>Solid Earth Geophysics</b>												
<b>Cross Disciplinary</b>												

## Definitions of Broad Teaching/Research Areas

The lists below give the sub-disciplines which comprise the broad areas used in this study. You will find examples of cross-disciplinary areas listed under astronomy and Solar System Science: these are also repeated in the list of cross-disciplinary areas.

### **ASTRONOMY (including PARTICLE ASTROPHYSICS)**

- AA Historical and Educational research
- AB Positional astronomy/Celestial mechanics
- AC Stars
- AD Interstellar matter
- AE Radio, submillimetre, infrared sources or background
- AF UV/X-ray sources or background
- AG Gamma-ray sources or background
- AH Cosmic rays
- AI Particle astrophysics
- AJ Gravitational waves
- AK Galaxies/Extragalactic
- AL Cosmology
- AM Databases (incl Virtual Observatories)
- AN Physical data and processes
- AO Site testing - astronomical sites
- AP Circumstellar matter, debris disks, exoplanets
  
- CB Cross Discipline - Internal magnetic dynamos in stars and planets
- CC Cross Discipline - Helioseismology/Asteroseismology
- CE Cross Discipline - Plasma physics (incl space, solar, astrophysical and laboratory)

### **SOLAR SYSTEM SCIENCE (including The EARTH as a Planet)**

- SA Solar System - origin/evolution
- SB Meteorites/Comets
- SC Solar studies
- SD Heliospheric studies
- SE Magnetosphere(s) (incl. Induced Magnetospheres, Cometary Plasmas)
- SF Ionosphere/Thermosphere (incl. radio propagation)
- SG Planetary atmospheres
- SH Planetary surface features
- SI Planetary sub-surface (incl search for water)
- SJ Planetary interiors
- SK Exobiology
- SL Earth - Middle atmosphere and climate
- SM Earth - Lower atmosphere (incl Oceanography)
  
- CA Cross Discipline - Earth and planetary atmospheres
- CB Cross Discipline - Internal magnetic dynamos in stars and planets
- CC Cross Discipline - Helioseismology/Asteroseismology
- CD Cross Discipline - Sun-climate studies
- CE Cross Discipline - Plasma physics (incl space, solar, astrophysical and laboratory)

### **SOLID EARTH GEOPHYSICS**

- GA Earth Structure

## The Demographics and Research Interests of the UK Astronomy and Geophysics Communities 2010

GB Electromagnetics  
GC Exploration Geophysics  
GD Geodesy and Gravity  
GE Geomagnetism and Palaeomagnetism  
GF Global Change  
GH Hydrology  
GI Marine Geophysics  
GJ Mathematical Geophysics  
GK Mineral Physics  
GL Oceanography  
GM Physical Properties of Rocks  
GN Physics of the Earth's Interior  
GO Seismology  
GP Tectonophysics  
GP Site testing

### **CROSS DISCIPLINARY**

CA Earth and planetary atmospheres  
CB Internal magnetic dynamos in stars and planets  
CC Helioseismology/Asteroseismology  
CD Sun-climate studies  
CE Plasma physics (incl space, solar, astrophysical and laboratory)

## Appendix D: The Individual Questionnaire

# The Demographics and Research Interests of the UK Astronomy and Geophysics

The Royal Astronomical Society (RAS) wants to know about your research interests and the way you spend your time at work.

The following survey will ask different questions depending on whether you hold a permanent position as a member of staff in a university or research institute, or are a fixed-term postdoctoral researcher, or a postgraduate student.

Surveys have been carried out by the RAS periodically since 1988. The information that we collect will enable us to assess how the make-up of the community has changed over the last few years, and to help us plan for the future and provide information and numbers to aid our policy work.

For information about the background to the survey please contact Robert Massey, Deputy Executive Secretary (rm@ras.org.uk) or Helen Walker (helen.walker@stfc.ac.uk).

The RAS has commissioned Oxford Research and Policy to administer and analyse the survey.

For enquiries about this survey please contact Sean McWhinnie of Oxford Research and Policy at sean.mcwhinnie@oxfordresearchandpolicy.co.uk

The results of this questionnaire will be published in non-attributable form with a commentary. Information relating to individuals or specific institutions will be confidential to the RAS and Oxford Research and Policy and will not be released in attributable form without prior permission. It is our intention to use the data only in the way that is declared here. Under the provision of the Data Protection Act, however we ask you to be aware that the information will be held on a computerised database.

### Your status

**What role do you hold? Please pick the one which is closest**

- Professor (*Go to Permanent staff: about you*)
- Reader (*Go to Permanent staff: about you*)
- Senior Lecturer (*Go to Permanent staff: about you*)
- Lecturer (*Go to Permanent staff: about you*)
- Permanent Research Fellow/Staff (Research Facility/Research Institute) (*Go to Permanent Research Fellows: funding*)
- Permanent Research Fellow/Staff (University) (*Go to Permanent Research Fellows: funding*)
- Temporary/Fixed-term Postdoctoral Research Associate (*Go to Postdoctoral fellows: about you*)
- Permanent/Fixed-term Technical or support staff (excl. admin) (*Go to Technical and support staff: about you*)
- Long-term visitor (*Go to Long-term visitor*)
- Postgraduate Research Student
- Other (please specify) \_\_\_\_\_

### Long-term visitor

After answering the question below about where you are visiting from, you will be asked to answer questions about yourself and how you spend your time. Please answer these questions based on how you spend your time as an academic visitor.

**Where are you visiting from? Please indicate your institution/company and its location.**

---

## Permanent Research Fellows: funding

After answering the question below about the source of funding for your post, you will be asked a series of questions about you and how you spend your research and non-research time.

### Where does the funding for your post come from?

- STFC
- NERC
- EPSRC
- BBSRC
- Royal Society
- Industry
- University/Department
- Other (please specify) \_\_\_\_\_

## Permanent staff: about you

### What is your age?

- |                                |                                |
|--------------------------------|--------------------------------|
| <input type="checkbox"/> 20-24 | <input type="checkbox"/> 50-54 |
| <input type="checkbox"/> 25-29 | <input type="checkbox"/> 55-59 |
| <input type="checkbox"/> 30-34 | <input type="checkbox"/> 60-64 |
| <input type="checkbox"/> 35-39 | <input type="checkbox"/> 65-69 |
| <input type="checkbox"/> 40-44 | <input type="checkbox"/> 70+   |
| <input type="checkbox"/> 45-49 |                                |

### What is your gender?

- Male
- Female
- Do not wish to say

### In which institution/organisation and department do you hold your current position?

\_\_\_\_\_

### Are you part-time or full-time?

- Part-time
- Full-time

### What is your nationality?

- British
- Other European Union
- Other (please specify) \_\_\_\_\_

### What is your ethnic group?

- |   |   |
|---|---|
| <input type="checkbox"/> White                        | <input type="checkbox"/> Chinese                          |
| <input type="checkbox"/> Indian                       | <input type="checkbox"/> Mixed: White and Asian           |
| <input type="checkbox"/> Pakistani                    | <input type="checkbox"/> Mixed: White and Black African   |
| <input type="checkbox"/> Bangladeshi                  | <input type="checkbox"/> Mixed: White and Black Caribbean |
| <input type="checkbox"/> Black African                | <input type="checkbox"/> Do not wish to say               |
| <input type="checkbox"/> Black Caribbean              |   |
| <input type="checkbox"/> Other (please specify) _____ |   |

**Do you consider yourself disabled?**

- Yes
- No
- Do not wish to say

**How many children do you have? Please include grown up children in your answer.**

- |                                     |   |
|-------------------------------------|---|
| <input type="checkbox"/> None       | <input type="checkbox"/> 4 children           |
| <input type="checkbox"/> 1 child    | <input type="checkbox"/> 5 children           |
| <input type="checkbox"/> 2 children | <input type="checkbox"/> More than 5 children |
| <input type="checkbox"/> 3 children |   |

**Have you had one or more career breaks since you first held a permanent post totalling 3 months or more?**

- Yes
- No

**Permanent staff: career breaks**

**For what reasons have one or more career break(s)? Please mark all that apply**

- Parental leave
- Caring for a family member
- Illness
- Other (please specify below if you wish to)

Other (from above) \_\_\_\_\_

**How long in total have you had off during your career break(s)?**

- |                                      |   |
|--------------------------------------|---|
| <input type="checkbox"/> 3-6 months  | <input type="checkbox"/> 3-4 years          |
| <input type="checkbox"/> 6-12 months | <input type="checkbox"/> 4-5 years          |
| <input type="checkbox"/> 1-2 years   | <input type="checkbox"/> 5-10 years         |
| <input type="checkbox"/> 2-3 years   | <input type="checkbox"/> More than 10 years |

**Permanent staff: your research**

**What is/are the main discipline(s) that you work in? Please mark all that apply.**

- I don't work in any areas related to Astronomy or Geophysics
- Astronomy: Astronomy and/or Astrophysics (A)
- Astronomy: Particle Astrophysics (PA)
- Solar System: Planetary Science (PS)
- Solar System: Earth Observation (EO)
- Solar System: Atmospheric Science (AS)
- Solar System: The Sun (S)
- Solar System: Solar-Terrestrial Physics (STP)
- Solar System: Cross Discipline Topics
- Geophysics: Solid Earth Geophysics (SEG)
- Other Related Subject (please specify)

Please describe your "other" activities \_\_\_\_\_

### Permanent staff: your time

Please indicate how your time is divided between the activities listed below. Please ensure that the percentages total to 100.

- Research
- Undergraduate teaching
- Postgraduate teaching
- Administration associated with job
- External professional activities (journal editing, professional body work, etc)
- Public engagement/outreach
- Other

Proportion of time


### Permanent staff: your research areas

We are interested to learn which area(s) of research you spend your time on. Please could you select up to 5 research areas from the lists below.

What are your main research areas?

Please select NO MORE THAN A TOTAL OF 5 research areas from the lists specified for Astronomy, Solar System Science and Solid Earth Geophysics, or from the broad areas. Where you select one of the ASTERISKED AREAS, please specify below more details.

Note: categories to some extent overlap, and we have identified some cross disciplinary categories. Please use the combination of category and activity, which most accurately describes your research

#### ASTRONOMY (including PARTICLE ASTROPHYSICS)

- AA Historical and Educational research
- AB Positional astronomy/Celestial mechanics
- AC\* Stars
- AD Interstellar matter
- AE Radio, submillimetre, infrared sources or background
- AF UV/X-ray sources or background
- AG Gamma-ray sources or background
- AH Cosmic rays
- AI Particle astrophysics
- AJ Gravitational waves
- AK\* Galaxies/Extragalactic
- AL\* Cosmology
- AM Databases (incl Virtual Observatories)
- AN Physical data and processes
- AO Site testing — astronomical sites
- AP Circumstellar matter, debris disks, exoplanets
- CB Cross Discipline — Internal magnetic dynamos in stars and planets
- CC Cross Discipline — Helioseismology/Asteroseismology
- CE Cross Discipline — Plasma physics (incl space, solar, astrophysical and laboratory)
- Other astronomy area (please specify) \_\_\_\_\_

#### SOLAR SYSTEM SCIENCE (including The EARTH as a Planet)

- SA Solar System — origin/evolution
- SB Meteorites/Comets
- SC Solar studies
- SD Heliospheric studies
- SE\* Magnetosphere(s) (Induced Magnetospheres, Cometary Plasmas)

The Demographics and Research Interests of the UK Astronomy and Geophysics Communities 2010

- SF\* Ionosphere/Thermosphere (incl radio propagation)
- SG\* Planetary atmospheres
- SH\* Planetary surface features
- SI\* Planetary sub-surface (incl search for water)
- SJ\* Planetary interiors
- SK\* Exobiology
- SL Earth — Middle atmosphere and climate
- SM Earth - Lower atmosphere (incl Oceanography)
- CA Cross Discipline — Earth and planetary atmospheres
- CB Cross Discipline — Internal magnetic dynamos in stars and planets
- CC Cross Discipline — Helioseismology/Asteroseismology
- CD Cross Discipline — Sun-climate studies
- CE Cross Discipline — Plasma physics (incl space, solar, astrophysical and laboratory)
- Other solar system science area (please specify)\_\_\_\_\_

**SOLID EARTH GEOPHYSICS**

- GA Earth Structure
- GB Electromagnetics
- GC Exploration Geophysics
- GD Geodesy and Gravity
- GE Geomagnetism and Palaeomagnetism
- GF Global Change GH Hydrology
- GI Marine Geophysics
- GJ Mathematical Geophysics
- GK Mineral Physics
- GL Oceanography
- GM Physical Properties of Rocks
- GN Physics of the Earth's Interior
- GN Seismology
- GO Tectonophysics
- GP Site testing
- Other solid earth geophysics area (please specify)\_\_\_\_\_

**The following broad categories should only be used when the more specific ones are not appropriate.**

- XA Theoretical Astrophysics
- XB Theoretical Solar System work
- XC Theoretical Geophysics
- Y Instruments and Techniques
- Z Spacecraft
- + Other - please specify

Please give more information if you have selected one of the broad categories.

---

**If you have selected one or more of the ASTERISKED CATEGORIES above as one of your research areas, please indicate your research interests in more detail by selecting the appropriate research area(s) from the lists below.**

**AC Stars:**

- 1 Binaries
- 2 Interiors — Structure
- 3 Atmospheres

The Demographics and Research Interests of the UK Astronomy and Geophysics Communities 2010

- 4 Formation and Evolution
- 5 Pulsars
- 6 Supernovae
- 7 Planetary Nebulae
- 8 Planetary Systems
- 9 Variable (Pulsating/Eruptive)
- 10 Other

**AK Galaxies/Extragalactic:**

- 1 Active Galaxies
- 2 Clusters
- 3 Normal Galaxies
- 4 Quasars
- 5 Formation and Evolution
- 6 Interactions
- 7 Other

**AL Cosmology:**

- 1 Cosmic Microwave Background
- 2 Relativity
- 3 Dark Matter
- 4 Gravitational Lenses
- 5 Large Scale Structure
- 6 Other

**SE to SK Planetary Science:**

- 1 Mercury
- 2 Venus
- 3 Earth
- 4 Mars
- 5 Gas Giants
- 6 Titan
- 7 Other

**Permanent staff: your research time**

Please could you estimate the proportion of your research time that you spend on each of the following activities.

Please note that the total across all research areas should add to 100.

	Ground based	Space	Other
Theory and numerical modelling			
Observation/Data Collection			
Instrumentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data reduction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facility operation & maintenance			
Other (please specify below)			

**We should like to identify the pattern of use of facilities at various wavelengths. Please estimate below the percentage of your last year's research which you spent working on each wavelength.**

**Please could you ensure that the total adds to 100.**

	Radio	MM and sub-MM	IR	Optical	UV	X-ray	Gamma and Cosmic Ray
Theory and numerical modelling							
Observation/Data Collection							
Instrumentation <input type="checkbox"/>	<input type="checkbox"/>						
Data reduction <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data analysis <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facility operation & maintenance							
Other (please specify below)							

Other (from above). Please use this category if these wavelength categories are not applicable.

### Permanent staff: research facilities

**Please list the national and international research facilities that you have used in the last 24 months.**

### Permanent staff: any comments

**In the space below we would be grateful for your comments:**

- on issues relating to research and its funding
- your experiences of working as a researcher and how they could be improved
- anything else you wish to say

### Technical and support staff: about you

**What is your age?**

- |                                |                                |
|--------------------------------|--------------------------------|
| <input type="checkbox"/> 20-24 | <input type="checkbox"/> 50-54 |
| <input type="checkbox"/> 25-29 | <input type="checkbox"/> 55-59 |
| <input type="checkbox"/> 30-34 | <input type="checkbox"/> 60-64 |
| <input type="checkbox"/> 35-39 | <input type="checkbox"/> 65-69 |
| <input type="checkbox"/> 40-44 | <input type="checkbox"/> 70+   |
| <input type="checkbox"/> 45-49 |                                |

**What is your gender?**

- Male
- Female
- Do not wish to say

**Are you full-time or part-time?**

- Full-time
- Part-time

**Do you have a permanent (open ended) contract or temporary (fixed term) contract?**

- Permanent
- Temporary

**What is your nationality?**

- British
- Other European Union
- USA
- Other (please specify) \_\_\_\_\_

**What is your ethnic group?**

- |   |   |
|---|---|
| <input type="checkbox"/> White                        | <input type="checkbox"/> Chinese                          |
| <input type="checkbox"/> Indian                       | <input type="checkbox"/> Mixed: White and Asian           |
| <input type="checkbox"/> Pakistani                    | <input type="checkbox"/> Mixed: White and Black African   |
| <input type="checkbox"/> Bangladeshi                  | <input type="checkbox"/> Mixed: White and Black Caribbean |
| <input type="checkbox"/> Black African                | <input type="checkbox"/> Do not wish to say               |
| <input type="checkbox"/> Black Caribbean              |   |
| <input type="checkbox"/> Other (please specify) _____ |   |

**Do you consider yourself disabled?**

- Yes
- No
- Do not wish to say

**Technical and support staff: your role**

**Do you hold a joint appointment?**

- Yes, with a university
- Yes, with industry
- Do not hold a joint appointment

**Do you supervise students?**

- Yes
- No

**Please indicate how your time is divided between the activities listed below.**

**Please ensure that the percentages total to 100.**

**Please note that you will need to select a value (even if that value is 0) for each cell.**

	Proportion of time
Support <input type="checkbox"/>	<input type="checkbox"/>
Facility operations and maintenance	
Instrumentation <input type="checkbox"/>	<input type="checkbox"/>
Research <input type="checkbox"/>	<input type="checkbox"/>
Teaching <input type="checkbox"/>	<input type="checkbox"/>
Administration <input type="checkbox"/>	<input type="checkbox"/>
Public engagement/Outreach	
Other (please specify below)	

Please describe your "other" activities \_\_\_\_\_

**Is your work mostly space-based or ground-based?**

- Space-based
- Ground-based
- Both space- and ground-based
- Not applicable
- Other (please specify) \_\_\_\_\_

**We should like to identify the pattern of use of facilities at various wavelengths.**

Please indicate below which wavelength(s) you work on.

For further information, please briefly describe your role including, where appropriate, which instruments/facilities you work on

- Not applicable
- Radio MM and sub-MM
- IR
- Optical
- UV
- X-ray
- Gamma and Cosmic Ray
- Other (please specify below)

Other (from above). Please use this category if these wavelength categories are not applicable.

**Technical and support staff: any comments**

In the space below we would be grateful for your comments:

- on issues relating to research and its funding
- your experiences of working in your current role
- anything else you wish to say

## Postdoctoral fellows: about you

### What is your age?

- |                                |                                |
|--------------------------------|--------------------------------|
| <input type="checkbox"/> 20-24 | <input type="checkbox"/> 50-54 |
| <input type="checkbox"/> 25-29 | <input type="checkbox"/> 55-59 |
| <input type="checkbox"/> 30-34 | <input type="checkbox"/> 60-64 |
| <input type="checkbox"/> 35-39 | <input type="checkbox"/> 65-69 |
| <input type="checkbox"/> 40-44 | <input type="checkbox"/> 70+   |
| <input type="checkbox"/> 45-49 |                                |

### What is your gender?

- Male  
 Female  
 Do not wish to say

### What kind of fellowship do you hold?

- Postdoctoral Research Assistant  
 Advanced Fellowship  
 Royal Society Fellowship  
 Other (please specify)

### In which institution/organisation and department do you hold your current position?

---

### Are you part-time or full-time?

- Part-time  
 Full-time

### What is your nationality?

- British  
 Other European Union  
 USA  
 Other (please specify) \_\_\_\_\_

### What is your ethnic group?

- |   |   |
|---|---|
| <input type="checkbox"/> White                        | <input type="checkbox"/> Chinese                          |
| <input type="checkbox"/> Indian                       | <input type="checkbox"/> Mixed: White and Asian           |
| <input type="checkbox"/> Pakistani                    | <input type="checkbox"/> Mixed: White and Black African   |
| <input type="checkbox"/> Bangladeshi                  | <input type="checkbox"/> Mixed: White and Black Caribbean |
| <input type="checkbox"/> Black African                | <input type="checkbox"/> Do not wish to say               |
| <input type="checkbox"/> Black Caribbean              |   |
| <input type="checkbox"/> Other (please specify) _____ |   |

### Do you consider yourself disabled?

- Yes  
 No  
 Do not wish to say

**In which country did you obtain your PhD/DPhil?**

- UK
- Other European Union
- USA
- Elsewhere (please specify) \_\_\_\_\_

**How many years ago (whole or part) did you receive your PhD/DPhil?** \_\_\_\_\_

**Postdoctoral fellows: your research**

**What is/are the main discipline(s) that you work in?**

- I don't work in any areas related to Astronomy or Geophysics
- Astronomy: Astronomy and/or Astrophysics (A)
- Astronomy: Particle Astrophysics (PA)
- Solar System: Planetary Science (PS)
- Solar System: Earth Observation (EO)
- Solar System: Atmospheric Science (AS)
- Solar System: The Sun (S)
- Solar System: Solar-Terrestrial Physics (STP)
- Solar System: Cross Discipline Topics
- Geophysics: Solid Earth Geophysics (SEG)
- Other Related Subject (please specify)

Please describe your "other" activities \_\_\_\_\_

**Postdoctoral fellows: your time**

**Please indicate how your time is divided between the activities listed below. Please ensure that the percentages total to 100.**

	Proportion of time
Research	
Undergraduate teaching	
Postgraduate teaching	
Administration	
Public engagement/outreach	
Other	

Please describe your other activities \_\_\_\_\_

**Postdoctoral fellows: your research areas**

**We are interested to learn which area(s) of research you spend your time on. Please could you select up to 5 research areas from the lists below.**

**What are your main research areas?**

**Please select NO MORE THAN A TOTAL OF 5 research areas from the lists specified for Astronomy, Solar System Science and Solid Earth Geophysics, or from the broad areas. Where you select one of the ASTERISKED AREAS, please specify below more details.**

**Note: categories to some extent overlap, and we have identified some cross disciplinary categories. Please use the combination of category and activity, which most accurately describes your research**

**ASTRONOMY (including PARTICLE ASTROPHYSICS)**

- AA Historical and Educational research
- AB Positional astronomy/Celestial mechanics
- AC\* Stars
- AD Interstellar matter
- AE Radio, submillimetre, infrared sources or background
- AF UV/X-ray sources or background
- AG Gamma-ray sources or background
- AH Cosmic rays
- AI Particle astrophysics
- AJ Gravitational waves
- AK\* Galaxies/Extragalactic
- AL\* Cosmology
- AM Databases (incl Virtual Observatories)
- AN Physical data and processes
- AO Site testing — astronomical sites
- AP Circumstellar matter, debris disks, exoplanets
- CB Cross Discipline — Internal magnetic dynamos in stars and planets
- CC Cross Discipline — Helioseismology/Asteroseismology
- CE Cross Discipline — Plasma physics (incl space, solar, astrophysical and laboratory)
- Other astronomy area (please specify)\_\_\_\_\_

**SOLAR SYSTEM SCIENCE (including The EARTH as a Planet)**

- SA Solar System — origin/evolution
- SB Meteorites/Comets
- SC Solar studies
- SD Heliospheric studies
- SE\* Magnetosphere(s) (Induced Magnetospheres, Cometary Plasmas)
- SF\* Ionosphere/Thermosphere (incl radio propagation)
- SG\* Planetary atmospheres
- SH\* Planetary surface features
- SI\* Planetary sub-surface (incl search for water)
- SJ\* Planetary interiors
- SK\* Exobiology
- SL Earth — Middle atmosphere and climate
- SM Earth - Lower atmosphere (incl Oceanography)
- CA Cross Discipline — Earth and planetary atmospheres
- CB Cross Discipline — Internal magnetic dynamos in stars and planets
- CC Cross Discipline — Helioseismology/Asteroseismology
- CD Cross Discipline — Sun-climate studies
- CE Cross Discipline — Plasma physics (incl space, solar, astrophysical and laboratory)
- Other solar system science area (please specify)\_\_\_\_\_

**SOLID EARTH GEOPHYSICS**

- GA Earth Structure
- GB Electromagnetics
- GC Exploration Geophysics
- GD Geodesy and Gravity
- GE Geomagnetism and Palaeomagnetism
- GF Global Change GH Hydrology
- GI Marine Geophysics

The Demographics and Research Interests of the UK Astronomy and Geophysics Communities 2010

- GJ Mathematical Geophysics
- GK Mineral Physics
- GL Oceanography
- GM Physical Properties of Rocks
- GN Physics of the Earth's Interior
- GN Seismology
- GO Tectonophysics
- GP Site testing
- Other solid earth geophysics area (please specify)\_\_\_\_\_

**The following broad categories should only be used when the more specific ones are not appropriate.**

- XA Theoretical Astrophysics
- XB Theoretical Solar System work
- XC Theoretical Geophysics
- Y Instruments and Techniques
- Z Spacecraft
- + Other - please specify

Please give more information if you have selected one of the broad categories.

---

**If you have selected one or more of the ASTERISKED CATEGORIES above as one of your research areas, please indicate your research interests in more detail by selecting the appropriate research area(s) from the lists below.**

**AC Stars:**

- 1 Binaries
- 2 Interiors — Structure
- 3 Atmospheres
- 4 Formation and Evolution
- 5 Pulsars
- 6 Supernovae
- 7 Planetary Nebulae
- 8 Planetary Systems
- 9 Variable (Pulsating/Eruptive)
- 10 Other

**AK Galaxies/Extragalactic:**

- 1 Active Galaxies
- 2 Clusters
- 3 Normal Galaxies
- 4 Quasars
- 5 Formation and Evolution
- 6 Interactions
- 7 Other

**AL Cosmology:**

- 1 Cosmic Microwave Background
- 2 Relativity
- 3 Dark Matter
- 4 Gravitational Lenses
- 5 Large Scale Structure

6 Other

**SE to SK Planetary Science:**

- 1 Mercury
- 2 Venus
- 3 Earth
- 4 Mars
- 5 Gas Giants
- 6 Titan
- 7 Other

**Postdoctoral fellows: your research time**

Please could you estimate the proportion of your research time that you spend on each of the following activities.

Please note that the total across all research areas should add to 100.

	Ground based	Space	Other
Theory and numerical modelling			
Observation/Data Collection			
Instrumentation <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data reduction <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data analysis <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facility operation & maintenance			
Other (please specify below)			

We should like to identify the pattern of use of facilities at various wavelengths.

Please estimate below the percentage of your last year's research which you spent working on each wavelength.

Please could you ensure that the total adds to 100.

	Radio	MM and sub-MM	IR	Optical	UV	X-ray	Gamma and Cosmic Ray
Theory and numerical modelling							
Observation/Data Collection							
Instrumentation <input type="checkbox"/>	<input type="checkbox"/>						
Data reduction <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data analysis <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facility operation & maintenance							
Other (please specify below)							

Other (from above). Please use this category if these wavelength categories are not applicable.

### Postdoctoral fellows: research facilities

Please list the national and international research facilities that you have used in the last 24 months.

### Postdoctoral fellows: your funding

What is the main source of the funding for your post?

- STFC
- NERC
- EPSRC
- BBSRC
- Royal Society
- The University/Department
- Industry
- Other (please specify) \_\_\_\_\_

Do you hold another appointment concurrently with your fellowship (e.g. lectureship)?

- Yes
- No

Do you have an offer of a job or further training at the end of your current appointment?

- Yes
- No

### Postdoctoral fellows: your offer

Is your offer in the UK or overseas?

- UK
- Outside UK but in the European Union
- Outside the European Union
- Other

Please indicate the nature of the offer?

- Further study: scientific
- Further study: non-scientific
- Postdoctoral researcher
- Permanent academic post
- Scientist: Industry/commerce
- Scientist: Public sector
- Scientist: Other sector
- Working in a non-scientific role
- Other (please specify) \_\_\_\_\_

## Postdoctoral fellows: your prospects

Do you regard your prospects of obtaining a permanent UK post in your scientific discipline at the end of your present appointment as:

- Very good
- Good
- Reasonable
- Poor
- Impossible

Would you be prepared to take a permanent or long-term post outside the UK?

- Yes
- No
- No strong feelings

Ideally, would you like a permanent academic post in your scientific discipline?

- Yes
- No
- No strong feelings

## Postdoctoral fellows: the future

In the medium-term (i.e. in 3-5 years time) which of the following do you think you are most likely to be doing?

- Further study: scientific
- Further study: non-scientific
- Postdoctoral researcher
- Permanent academic post
- Scientist: Industry/commerce
- Scientist: Public sector
- Scientist: Other sector
- Working in a non-scientific role
- Other (please specify) \_\_\_\_\_

In the long-term (i.e. in 6-10 years time) which of the following do you think you are most likely to be doing?

- Further study: scientific
- Further study: non-scientific
- Postdoctoral researcher
- Permanent academic post
- Scientist: Industry/commerce
- Scientist: Public sector
- Scientist: Other sector
- Working in a non-scientific role
- Other (please specify) \_\_\_\_\_

### Postdoctoral fellows: any comments

In the space below we would be grateful for your comments on:

- your perceptions of working as a researcher
- your experiences and how they could be improved
- your career plans
- anything else you wish to say

### Research students: about you

What is your age?

- |                             |                                |
|-----------------------------|--------------------------------|
| <input type="checkbox"/> 20 | <input type="checkbox"/> 27    |
| <input type="checkbox"/> 21 | <input type="checkbox"/> 28    |
| <input type="checkbox"/> 22 | <input type="checkbox"/> 29    |
| <input type="checkbox"/> 23 | <input type="checkbox"/> 30    |
| <input type="checkbox"/> 24 | <input type="checkbox"/> 31-40 |
| <input type="checkbox"/> 25 | <input type="checkbox"/> 40+   |
| <input type="checkbox"/> 26 |                                |

What is your gender?

- Male
- Female
- Do not wish to say

In which institution/organisation and department do you hold your studentship?

---

What is your nationality?

- British
- Other European Union
- USA
- Other (please specify) \_\_\_\_\_

What is your ethnic group?

- White
- Indian
- Pakistani
- Bangladeshi
- Black African
- Black Caribbean
- Chinese
- Mixed: White and Asian
- Mixed: White and Black African
- Mixed: White and Black Caribbean
- Do not wish to say

Other (please specify) \_\_\_\_\_

**Do you consider yourself disabled?**

- Yes  
 No  
 Do not wish to say

**Research students: your research**

**What is/are the main discipline(s) that you work in?**

- I don't work in any areas related to Astronomy or Geophysics  
 Astronomy: Astronomy and/or Astrophysics (A)  
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 Solar System: Atmospheric Science (AS)  
 Solar System: The Sun (S)  
 Solar System: Solar-Terrestrial Physics (STP)  
 Solar System: Cross Discipline Topics  
 Geophysics: Solid Earth Geophysics (SEG)  
 Other Related Subject (please specify)

Please describe your "other" activities \_\_\_\_\_

**Research students: your degree**

**What is the source of the funding for your degree?**

**Please mark as many sources as apply**

- STFC  
 NERC  
 EPSRC  
 BBSRC  
 The University/Department  
 Industry  
 Self-Funded  
 Other (please specify) \_\_\_\_\_

**What degree are you studying for?**

- Masters  
 Doctorate

**Are you registered as full-time or part-time?**

- Full-time  
 Part-time

**Research students: part time**

**If part-time, what else are you doing?**

- Caring for family members  
 Employed full-time  
 Employed part-time  
 Voluntary work

Other (please specify)

## Research students: your research areas

We are interested to learn which area(s) of research you spend your time on. Please could you select up to 5 research areas from the lists below.

What are your main research areas?

Please select **NO MORE THAN A TOTAL OF 5** research areas from the lists specified for **Astronomy, Solar System Science and Solid Earth Geophysics**, or from the broad areas. Where you select one of the **ASTERISKED AREAS**, please specify below more details.

**Note: categories to some extent overlap, and we have identified some cross disciplinary categories. Please use the combination of category and activity, which most accurately describes your research**

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- SI\* Planetary sub-surface (incl search for water)
- SJ\* Planetary interiors
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- Other solar system science area (please specify) \_\_\_\_\_

### SOLID EARTH GEOPHYSICS

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- GB Electromagnetics
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- GD Geodesy and Gravity
- GE Geomagnetism and Palaeomagnetism
- GF Global Change GH Hydrology
- GI Marine Geophysics
- GJ Mathematical Geophysics
- GK Mineral Physics
- GL Oceanography
- GM Physical Properties of Rocks
- GN Physics of the Earth's Interior
- GN Seismology
- GO Tectonophysics
- GP Site testing
- Other solid earth geophysics area (please specify) \_\_\_\_\_

**The following broad categories should only be used when the more specific ones are not appropriate.**

- XA Theoretical Astrophysics
- XB Theoretical Solar System work
- XC Theoretical Geophysics
- Y Instruments and Techniques
- Z Spacecraft
- + Other - please specify

Please give more information if you have selected one of the broad categories.

---

**If you have selected one or more of the ASTERISKED CATEGORIES above as one of your research areas, please indicate your research interests in more detail by selecting the appropriate research area(s) from the lists below.**

### AC Stars:

- 1 Binaries
- 2 Interiors — Structure
- 3 Atmospheres
- 4 Formation and Evolution
- 5 Pulsars
- 6 Supernovae
- 7 Planetary Nebulae
- 8 Planetary Systems
- 9 Variable (Pulsating/Eruptive)
- 10 Other

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- 6 Interactions
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- 2 Relativity
- 3 Dark Matter
- 4 Gravitational Lenses
- 5 Large Scale Structure
- 6 Other

**SE to SK Planetary Science:**

- 1 Mercury
- 2 Venus
- 3 Earth
- 4 Mars
- 5 Gas Giants
- 6 Titan
- 7 Other

**Research students: your progress**

**In what year of your postgraduate course are you?**

- 1st Year
- 2nd Year
- 3rd Year
- 4th Year
- 5th Year
- 6th Year
- 7th or Higher Year

**Are you currently writing up your thesis?**

- Yes
- No

**When do you expect to submit your thesis?**

- With 6 months
- Within 1 year
- Within 2 years
- Within 3 years
- Within 4 years
- Do not know

**Which of the following statements best describes the main reason(s) you decided to do a postgraduate degree?**

**Please mark no more than two boxes**

- Out of interest and enthusiasm for science
- I have an aptitude for my subject
- I was inspired/encouraged by a tutor
- A research degree is a pre-requisite for the career I want
- To enhance my earning potential
- To give myself time to think about what to do next
- Don't know
- Other (please specify)

**From what sources did you receive advice before beginning your research degree?****Please mark all that apply**

- Undergraduate tutor/project supervisor
- Other academics
- University careers service
- Professional; (non-university) careers service
- Friends and family
- I did not receive any advice
- Other (please specify) \_\_\_\_\_

**On balance, are you pleased or disappointed you decided to do a research degree?**

- Very pleased
- Pleased
- Neither pleased nor disappointed
- Disappointed
- Very disappointed

**Research students: your motivations****Which of the following statements, best describes the main reason why you might be pleased you decided to do a research degree?**

- There is no reason
- I enjoy researching my topic
- I will have the experience I need for the career I want
- I will have a better understanding of a researcher's work
- I will have a better idea about my career plans
- Other (please specify)

**Which of the following statements, best describes the main reason why you might be disappointed you decided to do a research degree?**

- There is no reason
- It's hard academically
- Financial worries
- I've felt isolated
- I no longer want to work in science
- Other (please specify)

## Research students: your plans for the future

**How would you rate your awareness of career options within academia (for someone with a doctorate/masters)?**

- Very Good
- Good
- Adequate
- Poor
- Very Poor

**How would you rate your awareness of career options outside academia (for someone with a doctorate/masters qualification)?**

- Very Good
- Good
- Adequate
- Poor
- Very Poor

**Would you say you possess the majority of general skills that employers often look for?**

**Note: 'General skills' refers to non-technical skills e.g. communication, team-working and problem-solving skills**

- Yes
- No
- Don't know

**How much have you planned your next (i.e. once you've completed your research degree) career steps?**

- Fully
- A little
- Not at all

**Have you accepted a job offer or been accepted on a programme of further study or training, which is due to start on or near completion of your research degree?**

- Yes
- No

## Research students: your job or training offer

**Which of the following, best describes the job or study/training offer you have accepted?**

- Further study: scientific
- Further study: non-scientific
- Teacher Training
- Academic: Post doc
- Academic: Lecturer
- Scientist: Industry/commerce
- Scientist: Public sector
- Scientist: Other sector
- Other (please specify)

**Where is your offer?**

- In the UK
- Outside the UK but elsewhere in the European Union
- In the USA
- Elsewhere

**Research students: your next steps**

**On (or shortly after) completion of your studies, do you intend to seek employment in a role which specifically requires a scientific background (e.g. research, scientific publishing, technical sales, science teaching, etc.)?**

- Yes
- No
- Don't know

**On (or shortly after) completion of your studies, do you intend to seek employment specifically as a research scientist?**

- Yes
- No
- Don't know

**On (or shortly after) completion of your studies, do you intend to seek employment in the UK or abroad?**

**Please mark all that apply**

- I don't intend to seek employment
- Employment in the UK
- Employment outside the UK but elsewhere in the European Union
- Employment in the USA
- Employment elsewhere

**Research students: your career plans**

**In the medium-term (i.e. in 3-5 years time) which of the following do you think you are most likely to be doing?**

- Further study: scientific
- Further study: non-scientific
- Postdoctoral researcher
- Permanent academic post
- Scientist: Industry/commerce
- Scientist: Public sector
- Scientist: Other sector
- Working in a non-scientific role
- Other (please specify) \_\_\_\_\_

**In the long-term (i.e. in 6-10 years time) which of the following do you think you are most likely to be doing?**

- Further study: scientific
- Further study: non-scientific
- Postdoctoral researcher
- Permanent academic post
- Scientist: Industry/commerce
- Scientist: Public sector
- Scientist: Other sector
- Working in a non-scientific role
- Other (please specify) \_\_\_\_\_

### **Research students: any comments**

**In the space below we would be grateful for your comments on:**

- **your perceptions of working as a researcher**
- **your experiences and how they could be improved**
- **your career plans**
- **the advice you have received**

### **Thank you**

Thank you for spending time completing the survey.

The Royal Astronomical Society will be publishing a report on the results of the survey later in 2011.

**Oxford Research and Policy** is a consultancy which carries out research and evaluation, and specialises in higher education, science policy, and equality and diversity.

**t** +44 (0)1235 439188

**e** [info@oxfordresearchandpolicy.co.uk](mailto:info@oxfordresearchandpolicy.co.uk)

**w** [www.oxfordresearchandpolicy.co.uk](http://www.oxfordresearchandpolicy.co.uk)

**a** 2 Sutton Road, Milton, Abingdon, Oxfordshire OX14 4ET