The Demographics and Research Interests of the UK Astronomy and Geophysics Communities 2023

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A report for the Royal Astronomical Society
by
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Executive Summary

The study followed the same methodology as that carried out in 2010 and 2016. 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. 19 university departments/research groups returned the questionnaire. Data for a further 62 university departments/research groups were taken from their websites. None of the research establishments contacted returned the questionnaire. Staff data for six research establishments were collected from their website but a further two research establishment websites did not have staff information. The number of questionnaire returns was lower than the 40 in 2016.

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.

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

- Astronomy is the most populous RAS research area within universities with 1420 staff, followed by solid Earth geophysics with 591 staff and solar system science with 442staff. 293 staff were recorded as working in cross-disciplinary areas.
- As in 2010 and 2016, there is a relatively high proportion of professors in all research areas in universities (55% of astronomy staff in universities on academic grades are professors, 50% of staff in solar system science, 58% of staff in solid Earth geophysics, and 53% of staff in cross disciplinary areas).
- The number of researchers in universities (both those on fixed-term and open-ended contracts) has continued to rise. In astronomy and solar system science the 1993 survey recorded 362 researchers, rising to 524 in 2010, 601 in 2016, to 735 in 2023.
- The total number of technical staff recorded in universities rose from around 140 in 2010 to 208 in 2016 and then fell to 176 in 2023.
- In universities 13% of professors, 29% of Senior Lecturers/ Readers and 29% of lecturers in astronomy are women. In solar system science 20% of professors, 28% of Senior Lecturers/ Readers and 28% of lecturers in solar system science are women. In geophysics 17% of professors, 31% of Senior Lecturers/ Readers and 19% of lecturers in are women. It should be noted that the number of academic staff in solar system science is much smaller than in astronomy and solid Earth geophysics leading to greater variation in the proportions of staff who are women at particular grades. Comparing the data for 2010, 2016 and 2023 shows that in most staff grade/research area categories the proportion of staff who are women has risen or remained at a similar level. The most noticeable exception is at lecturer level in solid Earth geophysics where women's representation has fallen from 32% in 2010 to 28% in 2016 and 19% in 2023 but this

needs to be contrasted with a rise from 23% to 31% in women's representation at senior lecturer/reader level between 2016 and 2023.

- Astronomy, solar system science and geophysics continues to attract a higher proportion of women than physics, and in fact at lower levels attracts a higher proportion of women than might be expected, since only around 20% of entrants to A level physics are girls.
- In universities in astronomy and solar system science the median ages for each grade are: 30-34 years for fixed-term research staff (2010 and 2016: 30-34 years), 40-49 years for research staff on open-ended contracts (2010: 30-34 years; 2016: 35-39 years), 35-39 years for lecturers (2010 and 2016: 35-39 years), 45-49 years for senior lecturers/readers (2010 and 2016: 40-44 years), and 50-54 years for professors (2010: 55-59 years; 2016: 50-54 years). As in 2010 and 2016, the proportion of staff who are women falls with age.
- The numbers of PhD research students in universities and research establishments were 1161 in astronomy, 341 in solar system science and 417 in solid Earth geophysics. 81 research students were recorded as working in cross-disciplinary areas. 63% of research students are full-time and domiciled (permanently resident) in the UK and only 5% are studying part-time. The proportion of women is 31% among UK-domiciled students and 43% among non-UK domiciled. The data suggest that most students complete their studies within 4 years, and that most students do work on into a fourth year.
- The total full-time equivalent sizes of the respective communities (staff and students) are 2597 in astronomy, 790 in solar system science, and 1611 in solid Earth geophysics. 388 members of the community have cross disciplinary interests. The calculated sizes of all the astronomy and solar system science communities have increased, and the solid Earth geophysics community has decreased. Some of this fall is due to an erroneous questionnaire return in 2016.
- 79% 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.
- Of fixed-term researchers in astronomy and geophysics for whom leaving destinations are known, 76% moved on to roles within academia or research institutes and 19% moved to roles in industry. These patterns are like those found in 2010 and 2016, suggesting that little has changed in the patterns of leaving destinations of research staff.

1251 individuals started the on-line individual questionnaire, and 956 respondents provided enough information for some analysis.

Key results drawn from the data for permanent staff in universities and research establishments are:

- Among permanent staff 74% are British, 15% are from European Union countries, 3% are from the USA, and 5% are from other countries. 88% of permanent staff specified their

ethnicity as White. Considering only British respondents, 97% are White. Results from the 2021 census for England and Wales, and Northern Ireland, and the 2022 Scottish census combined showed that 83.0% of the population of the UK.

- 93% of permanent staff who indicated their sexual orientation reported themselves as heterosexual or straight, 3% as gay or lesbian and 3% as bisexual. For comparison, the England and Wales, and Northern Irish 2021 Census and the Scottish 2022 census data for the whole population show that 96.5% are heterosexual or straight, 1.6% are gay or lesbian, and 1.3% are bisexual. The declared sexual orientation of the permanent staff respondents is broadly in line with the national data.
- 72% of permanent staff respondents who disclosed their religious beliefs stated that they had no religion/were atheists, and 25% reported that they were Christian. The 2021 census data for England and Wales, and Northern Ireland, and the 2022 Scottish census data shows a very different pattern with 37.8% reporting that they had no religion. 46.5% of the population described themselves as Christian, 6.0% as Muslim and 1.6% as Hindu. Respondents to the survey were twice as likely as the general population to report that they had no religion.
- All grades of academic staff spend between 26% and 36% of their time on research activities. The proportion of time spent on research has fallen for all four groups since 2016, with the largest falls for Readers and Senior Lecturers. Readers, Senior Lecturers and Lecturers spend more time on undergraduate teaching (between 26 and 31%) than professors (21%), and all staff spend around 10 to 15% of their time on postgraduate teaching. The proportion of time spent on administration and on external professional activities increases with seniority but there is less difference between professors, readers and senior lecturers than in 2016: these groups spend about 20% of their time on administration. Staff spend about 5% of their time on public engagement and outreach. There has been relatively little change in the distribution of effort between 2010 and 2023.
- In universities, research fellows spend about 64% of their time on research and 6% of their time on undergraduate teaching, 4% on postgraduate teaching and 10% on administration.
- Outside universities, research staff report spending 53% of their time on research and 16% of their time on administration.
- 65% of permanent staff indicated that they have research interests in an *Astronomy* research area with 64% of the whole sample indicating an interest in *Astronomy and/or Astrophysics* and 6% indicating an interest in *Particle Astrophysics,* 33% indicated an interest in some aspects of *Solar System Science*, and 10% indicated an interest in *Geophysics*.

Key results drawn from the data for fixed-term postdoctoral research associates are:

- 175 respondents who completed the questionnaire indicated that they were temporary/fixed-term postdoctoral research associates, comprising 94 men, 74 women, 2 non-binary and 1 respondent who did not indicate their gender. Of these, 1 woman and 2 non-binary respondents indicated that their gender did not match that registered at birth.
- 53% of temporary/fixed-term postdoctoral research associates are British, and, of these, 89% of those who indicated their ethnicity are White. 21% of the sample are of European Union nationalities, down from 33% in 2016, and all who indicated their ethnicity are White. 20% of the sample indicated that they hold citizenship from outside the UK, the European Union or the United States, compared to 10% in 2016.
- 71% of the postdoctoral research associates who disclosed their religious beliefs stated that they had no religion/were agnostic, and 20% reported that they were Christian.
- 72% who indicated their sexual orientation reported themselves as heterosexual or straight, 3% as gay or lesbian and 15% as bisexual. There are differences by gender with 66% of women and 82% of men describing themselves as heterosexual or straight, no women and 6% of men as lesbian or gay, and 24% of women and 4% of men describing themselves as bisexual.
- 44% of British postdoctoral research associates are funded by the STFC and 27% of those of other nationalities. 13% of British postdoctoral research associates are funded by NERC, and 3% of other nationalities. 13% of British and 13% of other nationality postdoctoral research associates are funded by the European Commission/European Research Council. In 2016, 34% of other nationality postdoctoral research associates were funded by the European Commission/European Research Council; presumably the fall is an effect of Brexit
- On average postdoctoral research associates spend 81% of their time on research activities which is more than double the proportion of time spent by permanent academic staff. The proportion is in line with the time spent by research associates in 2010 and 2016.

Key results drawn from the data for postgraduate research students are:

- Of the 264 postgraduate research students working in areas related to astronomy who specified their gender, 41% are women, 50% are men, 7% are non-binary and 1% did not indicate their gender. In 2016, of those who indicated their sex, 35% were women, 65% were men. Of the 20 respondents who indicated interests in geophysics, 50% are women and 45% are men.
- Overall, 69% of postgraduate research student respondents are British, 16% are from the European Union, 3% are from the USA and 11% are of other nationalities.
- Among British postgraduate research students, ethnic minority groups are underrepresented. 92% of the British postgraduate research students who indicated their ethnicity are White, which is 5% higher than in 2016. 4% of British respondents are

Asian, 1% black and 2% mixed race. The England and Wales and Northern Irish census data for 2021 and the Scottish Census data for 2022 combined show that 79% of 20 to 29 year olds (82% of British postgraduate student survey respondents were aged between 20 and 29 years old) were White, 11% Asian, 4% Black, 4% mixed race, and 2% were from other ethnic groups.

- There were large gender differences in sexual orientation with 43% of women and 86% of men reporting that they were heterosexual or straight, 8% of women and 4% of men gay or lesbian, 33% of women and 5% of men bisexual, and 12% of women and 1% of men of other sexual orientation. The declared sexual orientation of the postgraduate research student respondents suggests that, for women in particular, a higher proportion are gay, lesbian or bisexual than the UK national population.
- 78% of postgraduate research student respondents who disclosed their religious beliefs stated that they had no religion, and 14% reported that they were Christian.
- 57% of British students in astronomy and solar system science receive funding from the STFC, 10% from the NERC, and 23% from their university. 12% of British students reported that they are self-funded either fully or in combination with another source of funding. 43% of non-British students are supported by their host university and/or department, 38% by research councils, and 11% are self-funded. 10% of all students indicated that have "other" sources of funding which comprise a variety of sources including funding from the research students' home governments.
- 44% of British solid Earth geophysics students receive their finding from NERC and 31% from the EPSRC.

Considering the results for all respondents:

- Combining the data for permanent staff and postdoctoral research associates allowed the assessment of the proportion of total effort expended on each general research activity. 32% of effort is expended on *Theory and numerical modelling* and 31% on *Data analysis*, 13% on *Observation/Data Collection*, 10% on *Data reduction*, and 9% on *Instrumentation*, 2% on *Facility operation and maintenance* and 4% on *Other* activities. Activities are split 61%, 30% and 9% between *Ground-based*, *Space* and *Other* areas respectively. The pattern of activity is like that described by respondents in 2010 and 2016.
- The astronomy community makes the greatest use of facilities at optical wavelengths with 41% of effort expended there, followed by facilities operating in the infrared (18%) and the radio (13%) regions of the electromagnetic spectrum.
- Over a period of 25 years the most notable changes in wavelength usage have been a fall in the amount of effort devoted to work at X-ray wavelengths from 20% to 9% and an increase in effort devoted to optical wavelengths from 33% to 41%.
- Within Astronomy the most popular research areas were Galaxies/Extragalactic (17.2% of researchers with interests in astronomy indicating an interest), Stars (13.8%),

Cosmology (9.5%) and Radio, sub millimetre, infrared sources or background (8.8%). This is the same order as in 2016 and 2010.

- Within *Solar System Science* the most popular research areas were *Cross Discipline - Space Weather* (10.9% of researchers indicating an interest), *Magnetosphere(s) (Induced Magnetospheres, Cometary Plasmas)* (9.9%), *Solar Studies* (8.1%), and *Planetary atmospheres* (7.9%). Of those who indicated their interests in planetary science, 25.9% (within the sub-field) indicated an interest in the *Earth*, 13.2% in *Mars*, and *11.3%* in *Jupiter.* In total 25.1% indicated an interest in the *Gas Giants.*
- Within *Solid Earth Geophysics* the most popular research areas are *Seismology* (15.7% of researchers with interests in geophysics indicating an interest), *Physics of the Earth's Interior* (12.9%) and *Earth Structure* (12.0%).
- The most popular facilities used by permanent staff respondents over the last two years were the European Southern Observatory (ESO), the Hubble Space Telescope, ALMA, the James Webb Space Telescope and SKA pathfinders.

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.

Thanks are also due to those staff and members of the Royal Astronomical Society who helped and advised with this project. In particular I would like to thank Robert Massey.

Sean McWhinnie
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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 Summer and Autumn of 2016.

This study follows surveys carried out in 1988[1], 1993[2], 1998[3], 2003, 2010[4] and 2016[5]. Results of the 2003 survey were not published.

The current study, like those in 2010 and 2016, 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 several questions about their career intentions. The analysis of these data is presented in a separate report.

This report follows a similar structure to the 2010 and 2016 reports to allow comparisons between the datasets. Where appropriate comparisons are made between the 2023 and 2016 data, and sometimes between the 2023, 2016 and 2010 datasets.

1 A. Wilkinson, Quarterly Journal of the RAS, 1990, 31, 411-455.

2 A. Wilkinson, Quarterly Journal of the RAS, 1996, 37, 769-817.

3 C. Tadhunter, Astronomy & Astrophysics, Journal of the RAS,1998, 41, 2.19-22

4 https://www.ras.ac.uk/ras-policy/community-demographics/2010-survey-demographics-and-research-interests-uk-astronomy-and

5 https://www.ras.ac.uk/ras-policy/community-demographics/demographic-survey-2017

2. Methodology

As in 2010 and 2016, a pro forma 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 pro forma was the same as that of that used in 2016 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 proforma 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 with Royal Astronomical Society members and by carrying out research on the internet. The full list of departments and research establishments that returned the questionnaire for university departments and research establishments is presented in Appendix B.

Where departments and research establishments believed to have research of interest did not return the pro forma, their websites were consulted, and data on the numbers of staff and research students working in the broad research areas of interest were collected (Appendix B). For the most part, grades could be identified for staff in universities, but grade information was, for all practical purposes, impossible to ascertain for staff working in research establishments.

It is also important to note that for staff data collected from websites, decisions were made how to classify their research interests on the basis of the website entries, rather than through completion of the pro forma *by an informed person. Particularly in the case of geophysics, this is likely to have affected the numbers.*

The number of university departments and research institutes returning the pro forma fell in 2016 and fell again in 2023. Feedback from some contacts in universities was that local data protection guidance did not allow them to supply the detailed information requested. In some of these cases no return was made and in others only total numbers of staff by grade and numbers of research students were returned. Other feedback was that completing the pro forma in full required too much work and/or the data requested were not easily accessible.

Given the lower number of pro forma returned compared to earlier years, the analyses of many demographic characteristics such as the ages of researchers are less reliable than in earlier years.

A questionnaire for individual researchers (Appendix D) was designed to collect detailed information about how individuals spend their time and what their research interests are, as well as asking for demographic information. The questionnaire also included questions for postdoctoral researchers and research students about their motivations and career intentions. For 2023, a few changes were made to some of the questions collecting demographic information.

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 through mailing lists and social media.

It is not known whether all the departments and research establishments contacted distributed the link to the survey, although we do know respondents' affiliations.

3. Results from the departmental and research establishment questionnaires

19 university departments/research groups returned the questionnaire returned the questionnaire. Data for a further 62 university departments/research groups were taken from their websites. None of the research establishments contacted returned the questionnaire. Staff data for six research establishments were collected from their website but a further two research establishment websites did not have staff information. For comparison, in 2010, 40 university departments and four research establishments returned the questionnaire and data for 47 further university departments/research groups and six other research establishment were taken from their websites.

Where data were drawn from websites, in a few cases, whilst staff information was available research student details were not published. Consequently, the number of research students in all areas is likely to be underestimated.

The full list of university departments and research establishments are presented in Appendix B.

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 remains the most populous research area within universities with 1420 staff, followed by solid Earth geophysics with 591 and solar system science with 442 staff. 293 staff were recorded as working in cross-disciplinary areas. Within research establishments, the most populous area is solid Earth geophysics with 603 staff. The other areas had relatively small numbers of staff. Astronomy had 16 staff in research establishments, solar system science had 7 staff, and 14 staff work in cross disciplinary areas.[6]

As previously, the largest proportion of staff in all research areas are fixed-term researchers,[7] the majority of whom will be postdoctoral researchers. In universities, in astronomy 33% of staff are fixed-term researchers, in solar system science 28% are, in solid Earth geophysics 28%, and in cross disciplinary areas 29%.

[6] Numbers of staff in Astronomy and Solar System Science working in research establishments are low because data from RAL Space are not included.

[7] Throughout section 3 it is assumed that most fixed-term researchers are postdoctoral research associates.

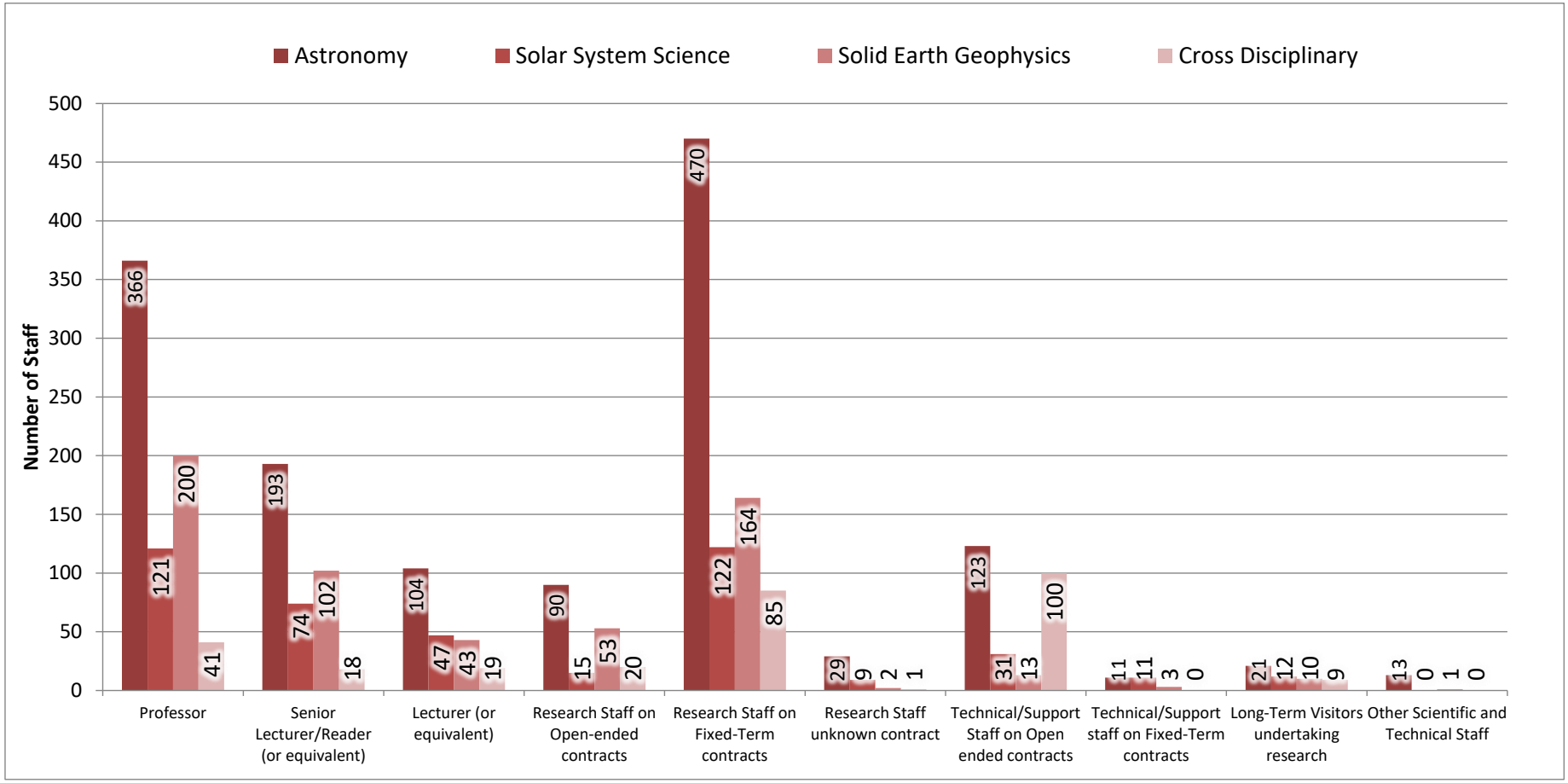

Figure 1: Total number of staff in post in universities with research interests in Astronomy, Solar System Science and/or Solid Earth Geophysics 2023

Table 1: Numbers (and proportions) of staff by grade working in universities and research establishments with research interests in Astronomy, Solar System Science and/or Solid Earth Geophysics in 2023

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	366 (25.8%)	3 (23.1%)	369 (25.8%)	121 (27.4%)	1 (20%)	122 (27.3%)	200 (33.8%)	1 (17%)	201 (33.7%)	41 (14.0%)	0	41 (14.0%)
Senior Lecturer/Reader (or equivalent)	193 (13.6%)	0 (0.0%)	193 (13.5%)	74 (16.7%)	0 (0%)	74 (16.6%)	102 (17.3%)	0 (0%)	102 (17.1%)	18 (6.1%)	0	18 (6.1%)
Lecturer (or equivalent)	104 (7.3%)	0 (0.0%)	104 (7.3%)	47 (10.6%)	0 (0%)	47 (10.5%)	43 (7.3%)	0 (0%)	43 (7.2%)	19 (6.5%)	0	19 (6.5%)
Research Staff on Open-ended contracts	90 (6.3%)	0 (0.0%)	90 (6.3%)	15 (3.4%)	0 (0%)	15 (3.4%)	53 (9.0%)	0 (0%)	53 (8.9%)	20 (6.8%)	0	20 (6.8%)
Research Staff on Fixed-Term contracts	470 (33.1%)	4 (30.8%)	474 (33.1%)	122 (27.6%)	0 (0%)	122 (27.3%)	164 (27.7%)	4 (67%)	168 (28.1%)	85 (29.0%)	0	85 (29.0%)
Research Staff on Unknown Contracts	29 (2.0%)	0 (0.0%)	29 (2.0%)	9 (2.0%)	0 (0%)	9 (2.0%)	2 (0.3%)	0 (0%)	2 (0.3%)	1 (0.3%)	0	1 (0.3%)
Technical/Support Staff on Open ended contracts	123 (8.7%)	0 (0.0%)	123 (8.6%)	31 (7.0%)	0 (0%)	31 (6.9%)	13 (2.2%)	1 (17%)	14 (2.3%)	100 (34.1%)	0	100 (34.1%)
Technical/Support staff on Fixed-Term contracts	11 (0.8%)	0 (0.0%)	11 (0.8%)	11 (2.5%)	0 (0%)	11 (2.5%)	3 (0.5%)	0 (0%)	3 (0.5%)	0 (0.0%)	0	0 (0.0%)
Long Term Visitors undertaking research	21 (1.5%)	6 (46.2%)	27 (1.9%)	12 (2.7%)	4 (80%)	16 (3.6%)	10 (1.7%)	0 (0%)	10 (1.7%)	9 (3.1%)	0	9 (3.1%)
Other Scientific and Technical Staff	13 (0.9%)	0 (0.0%)	13 (0.9%)	0 (0.0%)	0 (0%)	0 (0.0%)	1 (0.2%)	0 (0%)	1 (0.2%)	0 (0.0%)	0	0 (0.0%)
Total staff of known grade	1420 (100.0%)	13 (100.0%)	1433 (100.0%)	442 (100.0%)	5 (100.0%)	447 (100.0%)	591 (100.0%)	6 (100.0%)	597 (100.0%)	293 (100.0%)	0	293 (100.0%)
Scientific Staff (Unknown Grade)	0	3	3	0	2	2	0	597	597	0	14	14
Total Staff	**1420**	**16**	**1436**	**442**	**7**	**449**	**591**	**603**	**1194**	**293**	**14**	**307**

U - Universities, RE - Research Establishments

Consideration of the traditional academic grades of staff (professors, senior lecturers/readers, and lecturers) shows that, as in 2010 and 2016, there is a relatively high proportion of professors in all research areas (55% of astronomy staff in universities on academic grades are professors, 50% of staff in solar system science, 58% of staff in solid Earth geophysics, and 53% of staff in cross disciplinary areas). As in 2010 and 2016, on average these figures are higher than the proportion of professors in the physics cost centre, which stood at 50% in 2021/22.[8] (The figures for physics include a proportion of astronomy staff).

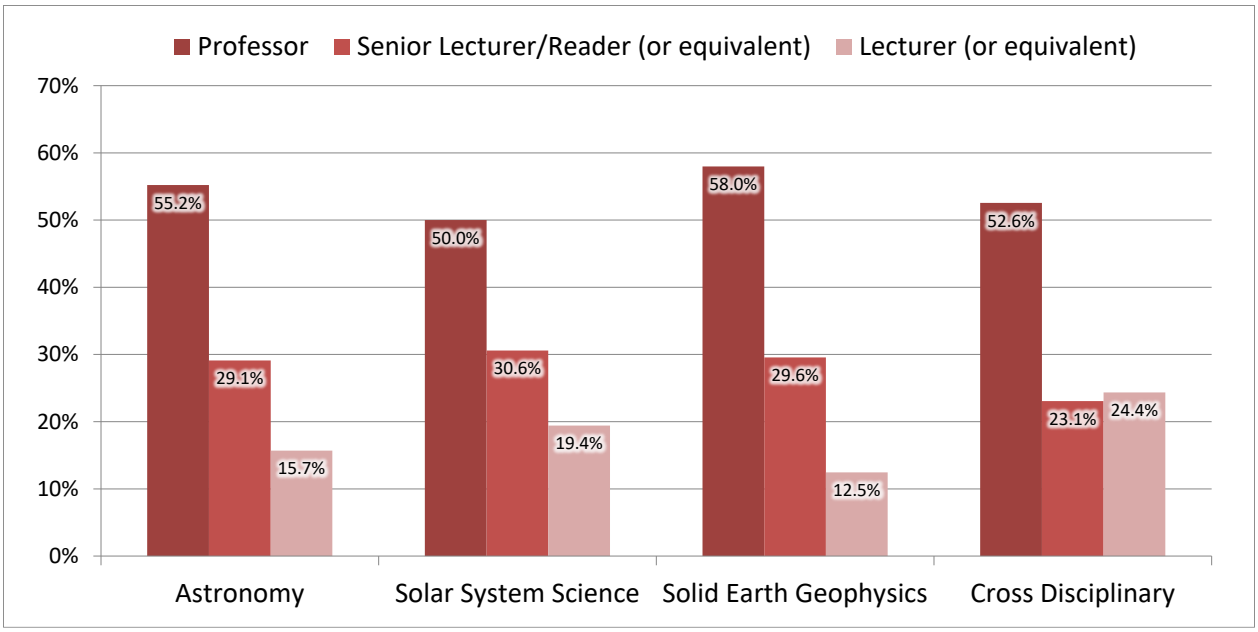

Figure 2: Proportion of academic staff at each grade in universities in each broad research area 2023.

Another indicator to consider is the ratio of research staff to academic staff in each research area. Considering only staff based in universities, the values for the ratio of research staff to academic staff for astronomy, solar system science, solid Earth geophysics are 0.89, 0.60, 0.63, respectively (2016: 1.04, 0.52, 0.61, respectively; 2010: 0.89, 1.08 and 0.45, respectively); the value for physics in 2021/22 was 0.77. The data suggest that, relative to the number of academic staff, astronomy academic staff employ more postdoctoral researchers than physics academics do overall, but solar system science and geophysics academics employ fewer.

[8] Higher Education Statistical Agency (HESA) Staff Data 2021/22. Data analyses as FTEs (not headcounts) for staff with a teaching and research employment function.

Table 2 presents data drawn from the 1998, 1993, 2010 and 2016 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 general trends are clear. The number of professors has risen significantly. The number of readers/senior lecturers has also risen. In contrast, although the number of lecturers has also risen the proportionate rise is much smaller than that for professors and readers/senior lecturers. Overall, the number of academic staff with research interests in astronomy and solar system science has risen from 292 in 1993, through 312 in 1998 and 514 in 2010, to 641 in 2016 and 905 in 2023.

The number of postdoctoral researchers in universities (permanent, fixed-term and unknown contract type) has continued to rise and now stands at 735 compared to 524 in 2010. The ratio of research to academic staff in astronomy and solar system science has risen from 0.98 in 2010 to 1.23 in 2023.

Although the number of recorded technical staff had risen to 2016, numbers subsequently fell to 154 permanent and 22 fixed-term technical staff in 2023. It should be noted that identifying technical staff from university websites is more difficult than identifying academic staff so changes in numbers may well reflect the lower number of universities that returned their questionnaires.

Data for the research establishments are not directly comparable given that the varying number of establishments form which data have been collected.

Table 2: Staff in astronomy and solar system science in 1993, 1998, 2010, 2016* and 2023

Job Type	Number of staff				
	1993	1998	2010	2016	2023
Staff in Universities					
Professors	77.5	98	231.7	302	487
Senior lecturers/Readers	99.5	97	165.5	204	267
Lecturers	114.7	117	117	135	151
Academic Staff Total	*291.7*	*312*	*514.2*	*641*	*905*
Research Staff on Open-ended contracts	39.5	20	51	71	105
Research Staff on Fixed-Term contracts	322.7	412	473	395	592
Research Staff on unknown contract				135	38
Research Staff Total	*362.2*	*432*	*524*	*601*	*735*
Permanent technical	128.6	77	76	141	154
Fixed-term technical	106.7	137	62	65	22
Technical Staff Total	*235.3*	*214*	*138*	*206*	*176*
Other	18.8	16	16	28	13
Total staff in Universities	*908*	*974*	*1192.2*	*1476*	*1829*
Staff in PPARC/STFC establishments**					
Permanent scientific	246	89	75	73	-
Permanent Technical	109	201	6	55	-
Fixed-term scientific	28	55	8	0	-
Fixed-term technical	11	64	0	0	-
Total in PPARC/STFC establishments	*394*	*409*	*89*	*128*	*-*

* 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 and 2016 data. Note that long term visitors undertaking research have not been included in the totals.

** Data for 10 research establishments are included in 1993 and 1998 figures. Data for 5 establishments are included in the 2010 figures. Data for 3 establishments are included in the 2016 figures. Not enough establishments submitted data in 2023.

3.2 Proportion of staff who are women

Table 3 shows the proportions of staff who are women at each grade in each broad research area for 2010, 2016 and 2023, and Figure 3 shows the proportions of women at each grade in each broad research area for 2023. 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 of staff are too small to allow a meaningful analysis.

The proportion of staff who are women varies by research grade, and between the research areas within each grade. Overall representation of women among academic staff has risen in the three research areas since 2016. In astronomy and solid Earth geophysics, about 1 in 5 academic staff, and in solar system science about 1 in 4 academic staff, are women.

In line with other university subjects the proportion of staff who are women broadly decreases with seniority. In astronomy 13% of professors, 29% of Senior Lecturers/ Readers and 29% of lecturers are women, in solar system science 20% of professors, 28% of Senior Lecturers/ Readers and 36% of lecturers are women, and in solid Earth geophysics 17% of professors, 31% of Senior Lecturers/ Readers and 19% of lecturers are women. The solid Earth geophysics data does not fit the pattern of women's representation falling with increasing seniority.

Table 3: Proportion of staff who are women in universities at each grade by broad research area, 2010, 2016 and 2023

Grade	Proportion of staff who are women by grade in each research area											
	Astronomy			Solar System Science			Solid Earth Geophysics			Physics*		
	2010	2016	2023	2010	2016	2023	2010	2016	2023	2010	2016	2022
Professor	6.4%	11.6%	13.1%	12.9%	21.2%	19.8%	8.1%	9.8%	16.5%	5.5%	10.9%	13.6%
Senior Lecturer/ Reader	14.5%	18.2%	28.5%	23.3%	22.2%	28.4%	16.2%	22.7%	31.4%	18.3%	14.1%	17.6%
Lecturer	27.3%	29.2%	28.8%	26.1%	27.6%	36.2%	32.4%	27.6%	18.6%		22.3%	26.8%
All Academics	**13.5%**	**17.3%**	**20.1%**	**19.9%**	**23.0%**	**25.6%**	**16.5%**	**18.8%**	**21.2%**	**14.1%**	**17.1%**	**17.4%**
Research Staff on Open-ended contracts	11.1%	20.7%	20.0%	14.3%	7.7%	26.7%	16.7%	33.3%	22.6%			
Research Staff on Fixed-Term contracts	27.2%	27.5%	27.9%	29.7%	33.3%	27.9%	30.0%	40.5%	34.1%			
Research Staff on Unknown Contracts		21.7%	20.7%		13.3%	22.6%		21.8%	38.5%			
All Researchers	**25.7%**	**25.5%**	**26.3%**	**27.6%**	**29.2%**	**27.4%**	**28.8%**	**34.3%**	**31.5%**	**18.8%**	**19.2%**	**21.6%**
Permanent Technical/ Support Staff	30.2%	28.1%	30.1%	15.4%	38.5%	22.2%	21.7%	31.5%	50.0%			
Fixed-Term Technical/ Support staff	20.8%	17.9%	36.4%	42.9%	11.1%	36.4%	0.0%	20.0%	0.0%			

* 2010: HESA Staff Data 2009/10; 2016: HESA Staff Data 2015/16; 2022: HESA Staff Data 2021/22 – data for 2009/10 and 2015/16 were analysed as headcounts, data for 2021/22 were analysed as FTEs

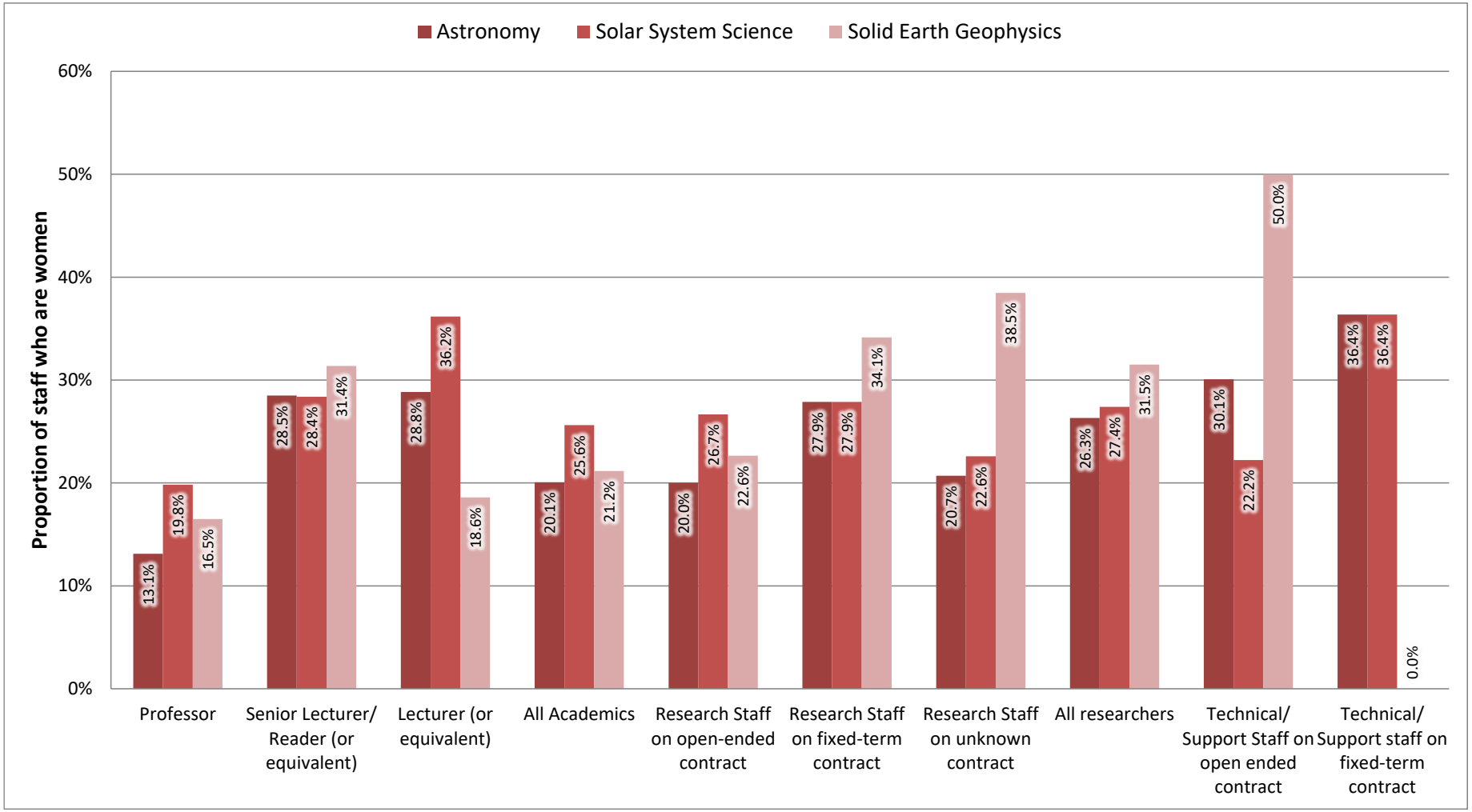

Figure 3: Proportion of staff who are women in universities at each grade by broad research area, 2023

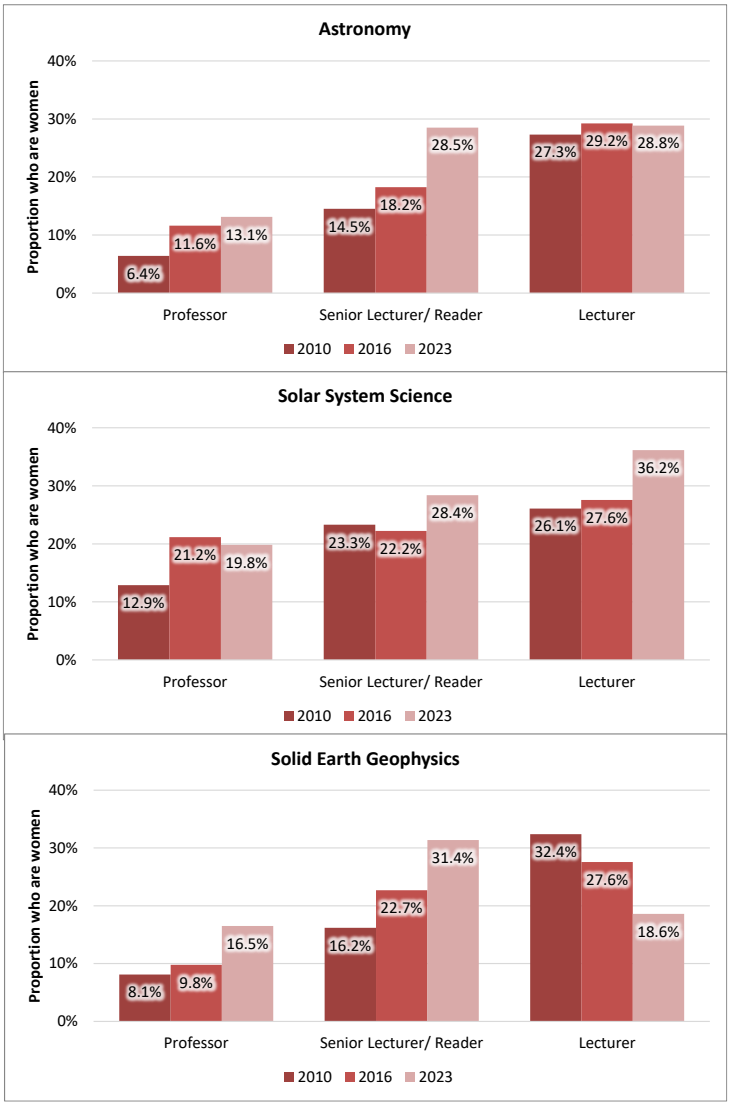

Figure 4: Proportion of academic staff who are women in universities by grade and broad research area, 2010, 2016 and 2023

Comparing the data for 2010, 2016 and 2023 shows (Figure 4) that in most staff grade/research area categories the proportion of staff who are women has risen or remained at a similar level. The most noticeable exception is at lecturer level in solid Earth geophysics where women's representation has fallen from 32% in 2010 to 28% in 2016 and 19% in 2023 but this needs to be contrasted with a rise from 23% to 31% in women's representation at senior lecturer/reader level between 2016 and 2023. It might be that a disproportionate number of women have progressed from lecturer to senior lecturer/reader level since 2016 in solid Earth geophysics.

Women's representation at professorial level has risen notably in all three research areas since 2010. Astronomy has the lowest representation at 13% but since 2010 representation has doubled. In solar system science women's representation among the professoriate has

increased from 13% in 2010 to 20% in 2023. In solid Earth geophysics, the proportion of professors who are women has increased from 8% in 2010 to 17% in 2023.

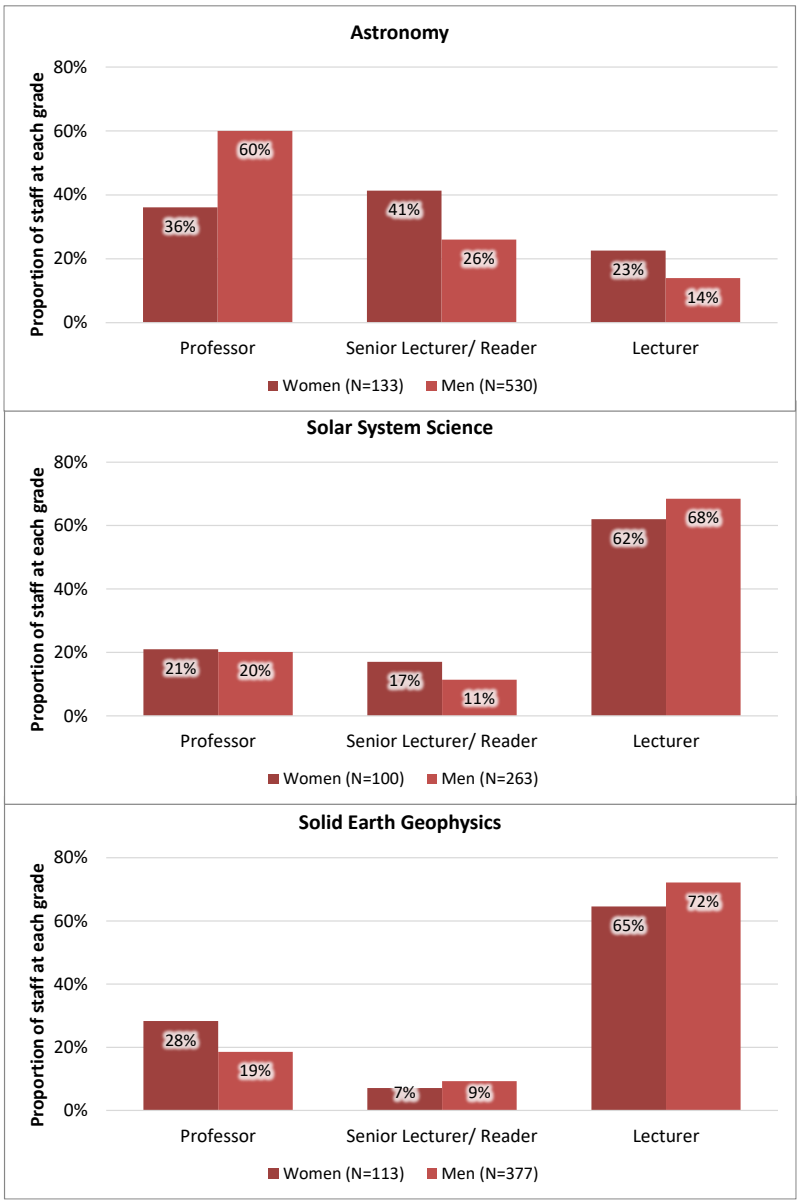

Figure 5: Distribution of academic staff in universities between grades by broad research area and gender, 2023

Another way of considering these data is to look at the distribution of staff between grades (Figure 5). The data show that astronomy contrasts with solar system science and solid Earth geophysics. In astronomy, 60% of men academic staff are professors in contrast to 36% of women academic staff. In the other two areas, most staff are at lecturer level and women are more likely than men to be at professorial level. It is not possible to explain the very different pattern in astronomy compared to the other areas.

As noted in 2010 and 2016, comparison with data for physics shows that in general in the research areas under consideration, the proportions of staff who are women are higher

confirming that women are more likely to work in (academic) astronomy and geophysics than in physics.

The data confirm conclusions in earlier reports that in common with all subjects the proportion of women is rising at all levels but that in in the three research areas under consideration, there is "leakage" of women in moving from junior to senior grades. Astronomy, solar system science and geophysics continue to appear to attract a higher proportion of women than physics, and in fact at lower levels attracts a higher proportion of women than might be expected since only around 20% of entrants to A level physics are women: in 2022/23 22.6% of those gaining an A level in physics were women.[9] As in 2016, it is notable that the proportion of professors who are women in Solar System Science is 20% which is higher than in astronomy or physics. The proportion of professors who are women in solid Earth geophysics, 17%, is also relatively high.

3.3 The age of staff

University departments and research establishments were asked to break their staff data down by age. As in 2010 and 2016, 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 age data presented below are for astronomy and solar system science staff in universities combined from 2016 (Figure 6) and 2023 (Figure 7). Age data were provided for less than half the number of staff in 2023 than 2016.

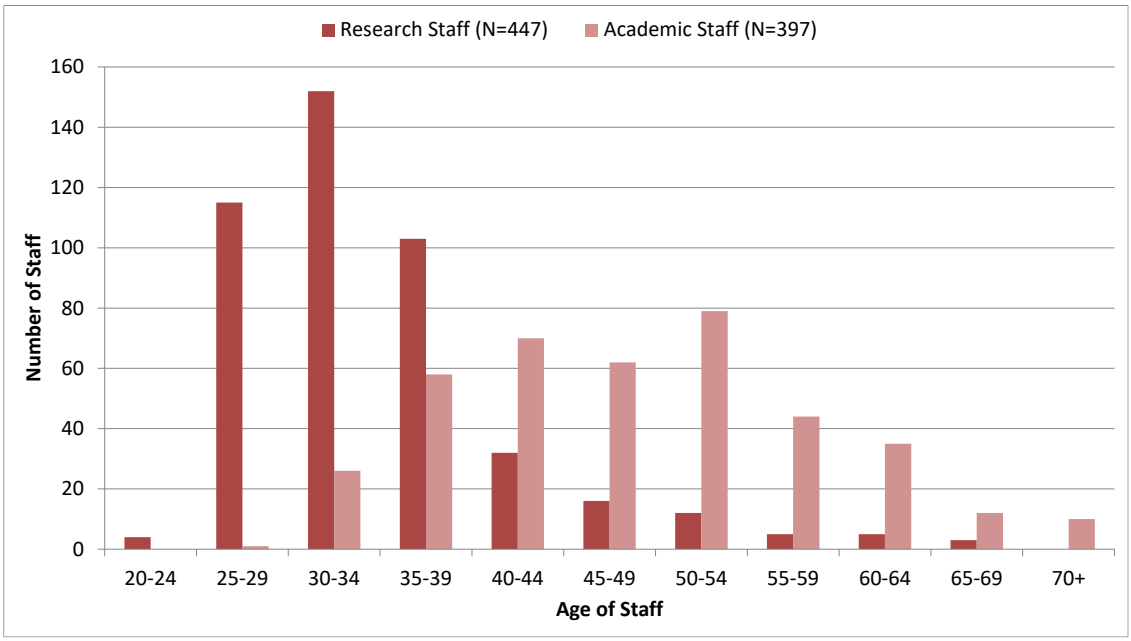

Figure 6: The age profiles of research and academic staff in university astronomy and solar system science, 2016

[9] Source: Department of Education (DfE)

In 2023, as in 2016 and 2010, the median age for research staff was 30-34 years and the median age for academic staff was 45-49 years as in 2016 but in contrast to 2010 when it was 40-44 years.

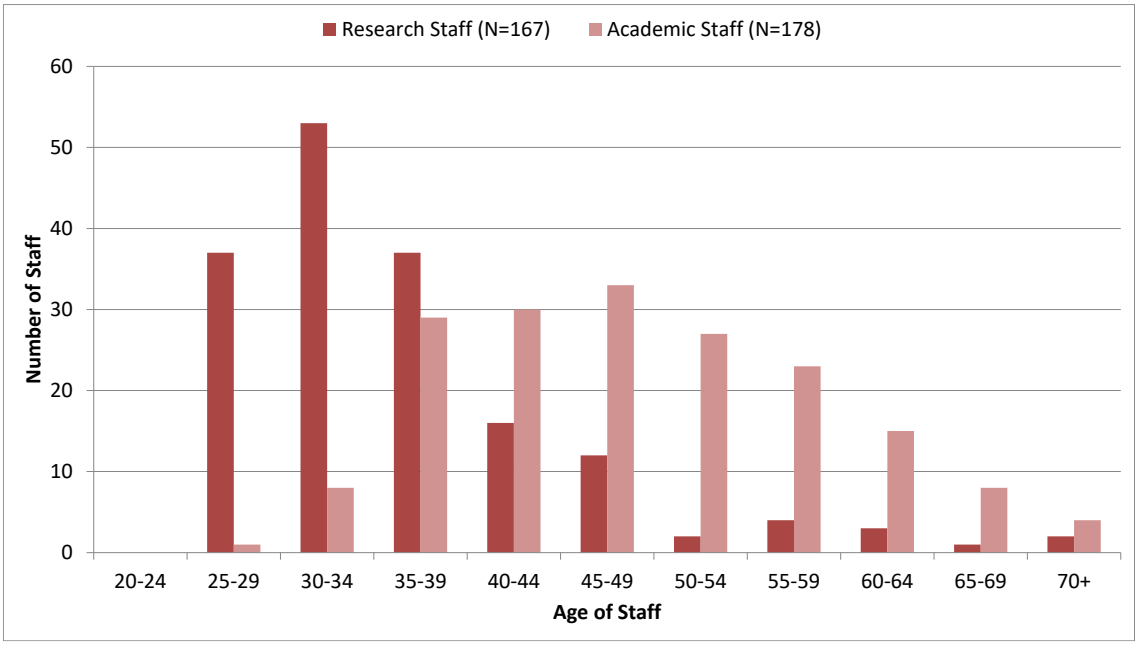

Figure 7: The age profiles of research and academic staff in university astronomy and solar system science, 2023

The data in Figure 9 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 research staff (2010 and 2016: 30-34 years), 40-49 years for research staff on open-ended contracts (2010: 30-34 years; 2016: 35-39 years), 35-39 years for lecturers (2010 and 2016: 35-39 years), 45-49 years for senior lecturers/readers (2010 and 2016: 40-44 years), and 50-54 years for professors (2010: 55-59 years; 2016: 50-54 years).

Compared to 2016, the permanent academic staff are on average about the same age and the research staff are on average slightly older. Also, as in 2010 and 2016, the proportion of staff who are women falls with age.

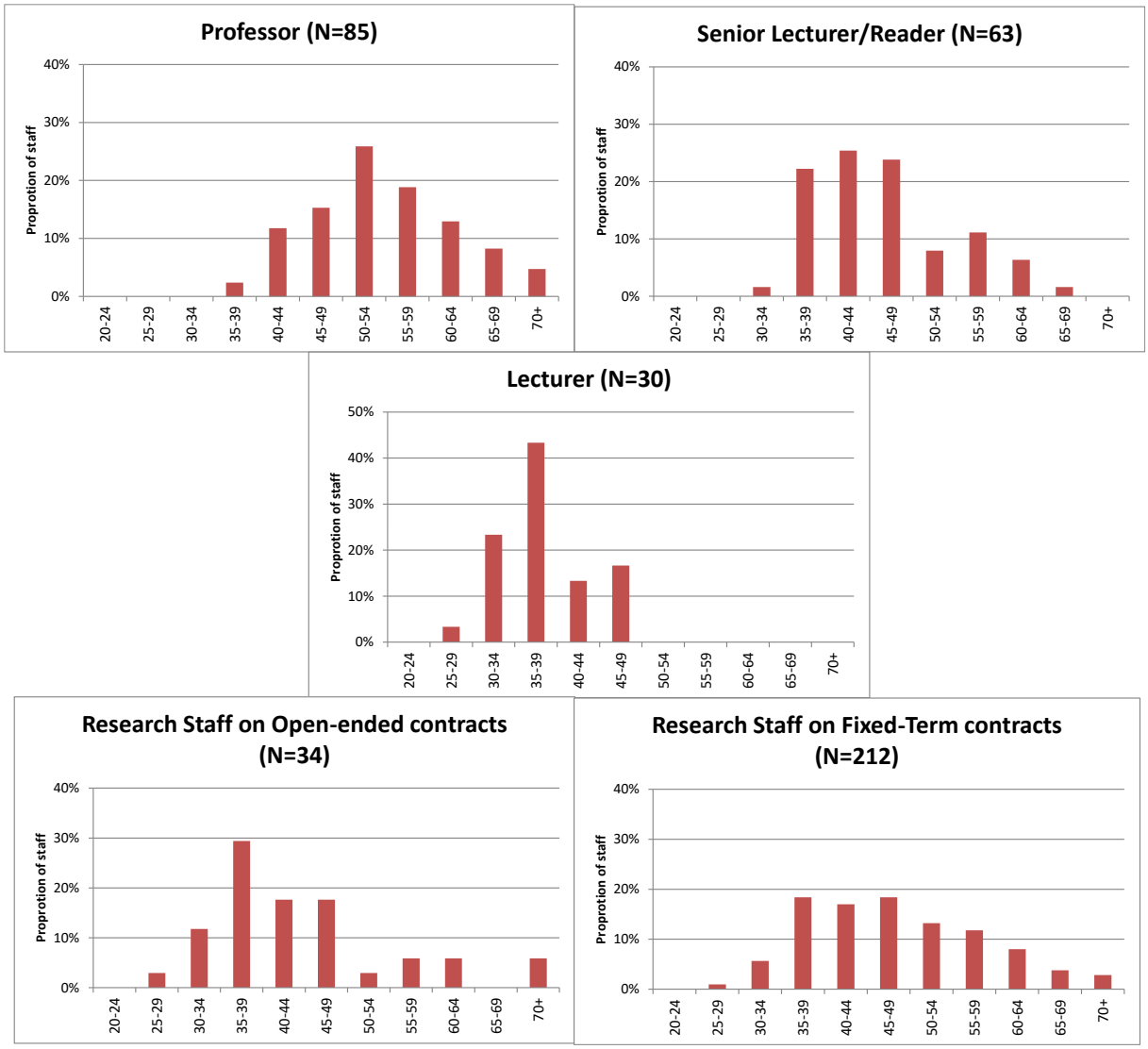

Figure 8: The age profiles of staff in astronomy and solar system science, 2023

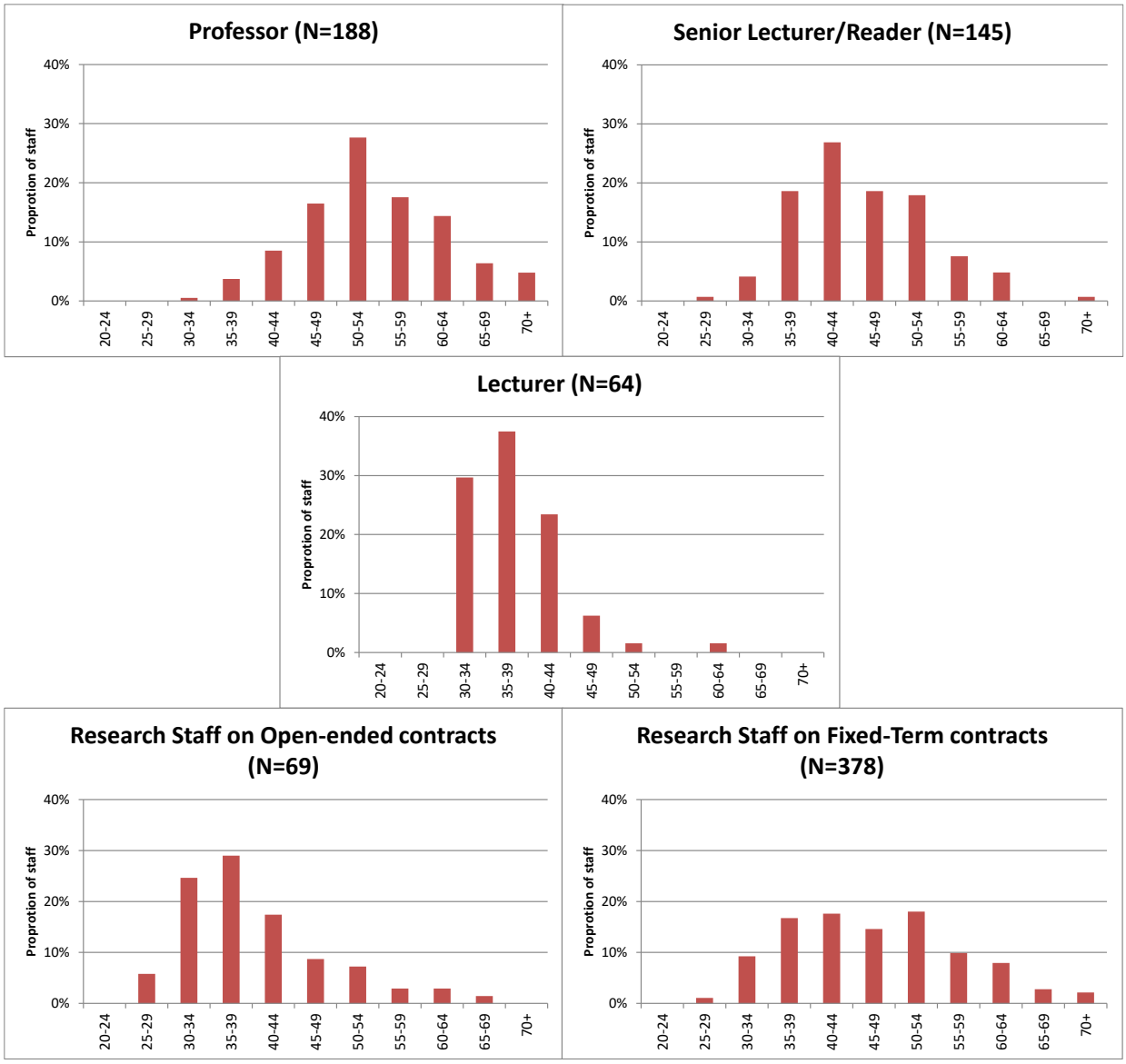

Figure 9: The age profiles of staff in astronomy and solar system science, 2016

In 2010 and 2016 the proportion of staff who are women fell with age. Data in Figure 10 and Figure 11 illustrate that in 2023 the proportion of research and academic staff who are women also falls as age increases albeit the smaller sample size in 2023 makes this conclusion more tenuous.

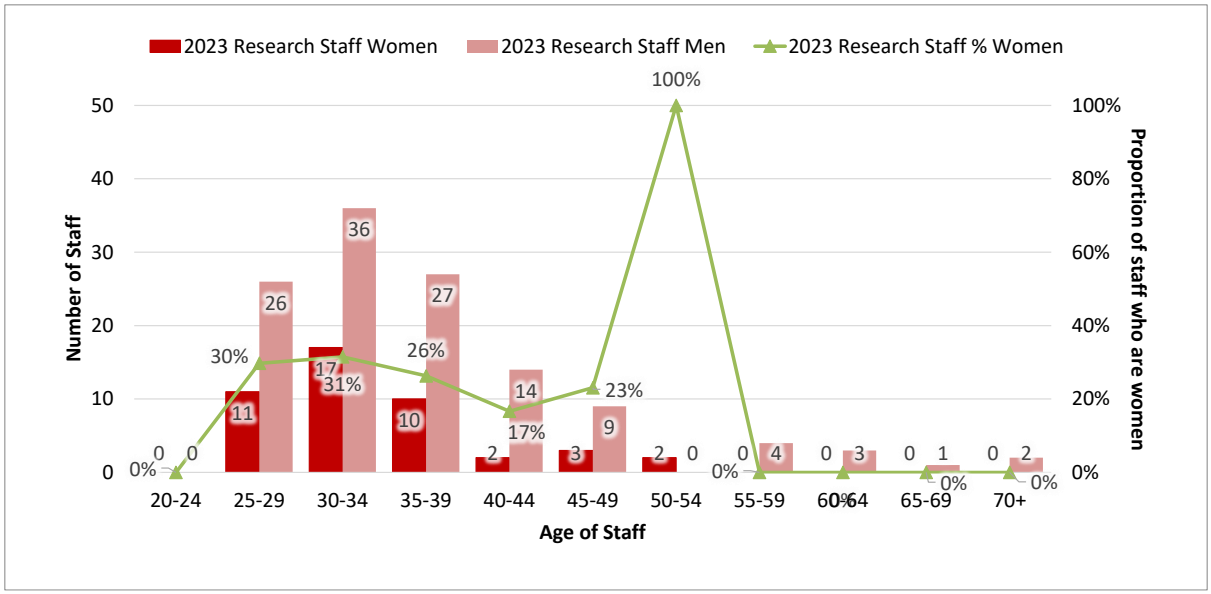

Figure 10: Numbers of research staff and proportion of research staff who are women by age in astronomy and solar system science, 2023

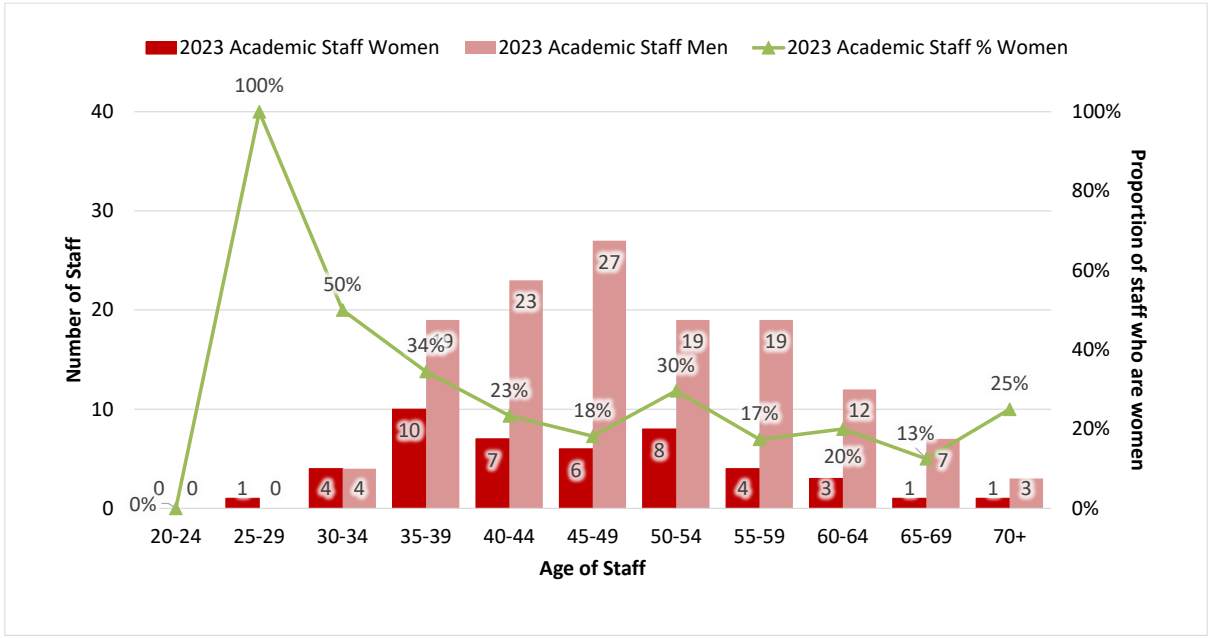

Figure 11: Numbers of academic staff and proportion of academic staff who are women by age in astronomy and solar system science, 2023

3.4 Staff leaving and joining

Table 4 presents data on the leavers and joiners in the four broad research areas over the last 5 years. Data are only presented for the 19 university departments that returned the questionnaires, that is, these data are from around just 20% of the university departments and research establishment from which staff data were collected and cover about 23% of the total staff in the broad research areas under consideration.

Table 4: Staff leaving and joining by broad research area over the previous 5 years, 2023*

	Grade	Staff leaving			Staff joining			Net change		
		M	F	All	M	F	All	M	F	All
Astronomy	Permanent Academic Staff	27	5	32	30	20	50	3	15	18
	Research Staff on Open-ended contracts	59	16	75	11	0	11	-48	-16	-64
	Research Staff on Fixed-Term contracts	105	48	153	131	53	184	26	5	31
	Research Staff on Unknown Contracts	2	4	6	0	0	0	-2	-4	-6
	Permanent Technical/Support Staff	5	0	5	4	2	6	-1	2	1
	Fixed-Term Technical/Support Staff	0	0	0	4	2	6	4	2	6
	Other scientific and Technical Staff	0	1	1	1	0	1	1	-1	0
	Total	**198**	**74**	**272**	**181**	**77**	**258**	**-17**	**3**	**-14**
Solar System Science	Permanent Academic Staff	3	2	5	3	4	7	0	2	2
	Research Staff on Open-ended contracts	2	2	4	9	6	15	7	4	11
	Research Staff on Fixed-Term contracts	20	9	29	35	11	46	15	2	17
	Research Staff on Unknown Contracts	0	0	0	0	0	0	0	0	0
	Permanent Technical/Support Staff	0	0	0	0	1	1	0	1	1
	Fixed-Term Technical/Support Staff	7	4	11	12	10	22	5	6	11
	Other scientific and Technical Staff	0	0	0	1	2	3	1	2	3
	Total	**32**	**17**	**49**	**60**	**34**	**94**	**28**	**17**	**45**
Solid Earth Geophysics	Permanent Academic Staff	2	0	2	4	1	5	2	1	3
	Research Staff on Open-ended contracts	0	0	0	3	1	4	3	1	4
	Research Staff on Fixed-Term contracts	12	8	20	20	13	33	8	5	13
	Research Staff on Unknown Contracts	0	0	0	0	0	0	0	0	0
	Permanent Technical/Support Staff	1	0	1	4	2	6	3	2	5
	Fixed-Term Technical/Support Staff	4	1	5	0	2	2	-4	1	-3
	Other scientific and Technical Staff	0	0	0	1	0	1	1	0	1
	Total	**19**	**9**	**28**	**32**	**19**	**51**	**13**	**10**	**23**
Cross Disciplinary	Permanent Academic Staff	2	0	2	0	0	0	-2	0	-2
	Research Staff on Open-ended contracts	0	0	0	0	0	0	0	0	0
	Research Staff on Fixed-Term contracts	1	0	1	2	1	3	1	1	2
	Research Staff on Unknown Contracts	0	0	0	0	0	0	0	0	0
	Permanent Technical/Support Staff	0	0	0	1	1	2	1	1	2
	Fixed-Term Technical/Support Staff	0	0	0	0	0	0	0	0	0
	Other scientific and Technical Staff	0	0	0	0	0	0	0	0	0
	Total	**3**	**0**	**3**	**3**	**2**	**5**	**0**	**2**	**2**

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

The data suggest that in the departments for which data are available, overall staff numbers increased by 46 staff, which represents approximately an 8% net increase in the staff contingent in the university department for which data are available. As would be expected, turnover was highest among fixed-term research staff, followed by research staff on open ended contracts.

The largest net changes were decreases in numbers of research staff on open-ended contracts in astronomy followed by increases in numbers of fixed term research staff in astronomy.

Figure 12: Distribution by age and gender of academic and research staff joining universities and research institutes across all broad research areas, 2023

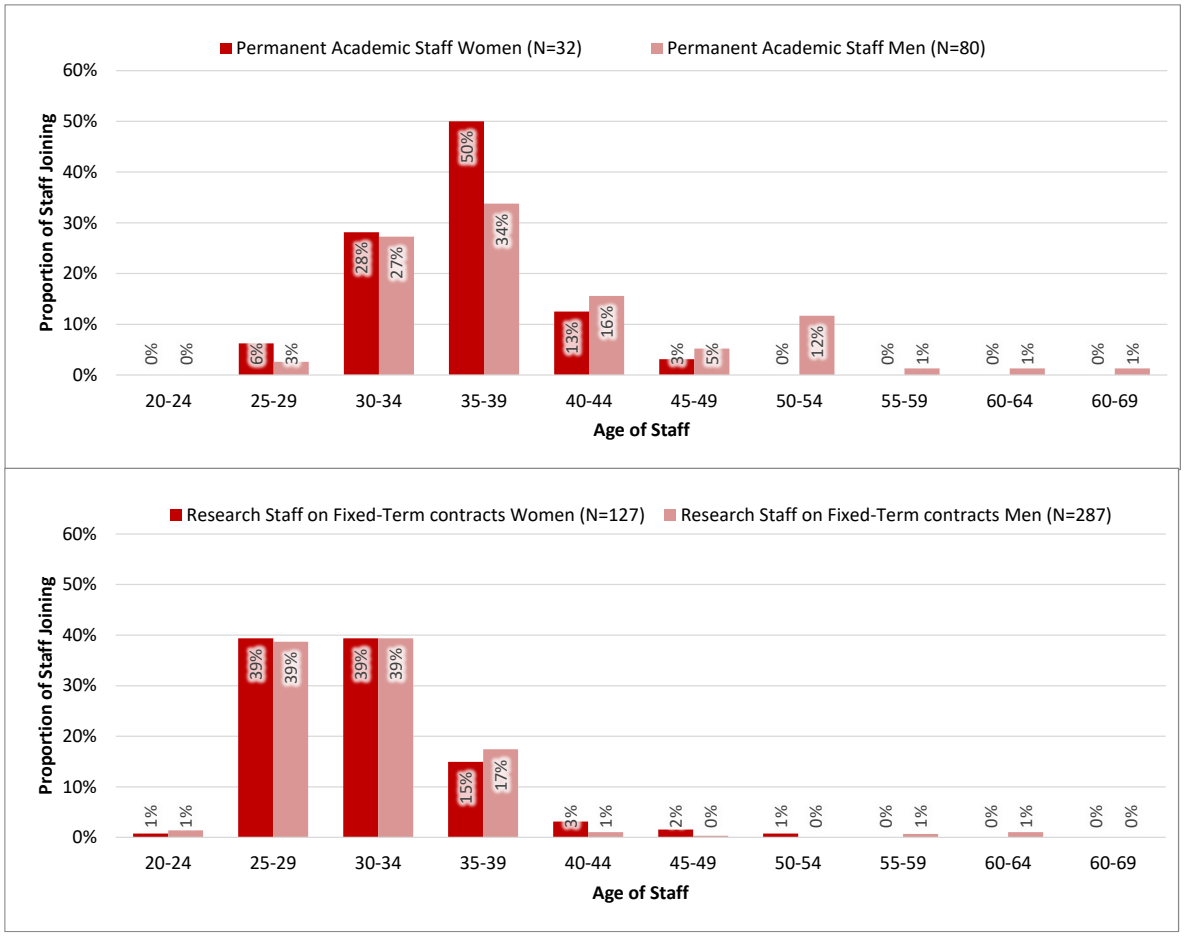

Figure 13: Distribution by age and gender of academic and research staff joining universities and research institutes across all broad research areas, 2016

In Figure 12 data are presented illustrating the distribution by age of men and women joining universities and research institutes across the four broad research areas under consideration. For comparison data for 2016 are shown in Figure 13.

For academic posts the median age for men and women joining is 35-39 years while for research posts the median age is 30-34 years but the mode is 25-29 years. This pattern fits with a picture of early career researchers moving between short-term posts in their lates twenties and early thirties before some of them gaining academic posts in their mid and late thirties.

Comparison between the data for 2023 and 2016 suggests that the mean age of those joining universities as researchers on fixed-term contracts was lower in the five years up to 2023 than in the five years up to 2016. This could be because there has been a fall in the numbers of staff taking up multiple fixed term research posts into their early thirties, or because there has been an increase in the numbers seeking and gaining post in their late twenties.

Table 5 presents data on the reasons given by those completing the questionnaires for why staff left. Patterns are like those in 2010 and 2016 except the proportion of permanent

academic staff moving to a new job in academia or a research institute abroad has increased from 18% to 34%.

Considering fixed-term research staff of whom there are by far the greatest number of leavers, 23% left to take up a new job in academia or in a research institute aboard, and 18% for a new job in academia or in a research institute in the UK. 34% are recorded as leaving because it was the end of their contracts and 12% for unknown reasons. As in 2010 and 2016, a relatively small proportion of fixed-term researchers are reported as leaving for a job in industry, 10%, and for a job outside scientific research, 1%.

Table 5: Reasons for leaving employment in astronomy, solar system science, geophysics and cross-disciplinary research by role, 2016 and 2023*

Reason for leaving	Staff Role													
	Permanent Academic Staff		Research Staff on Open-ended contracts		Research Staff on Fixed-Term contracts		Research Staff on Unknown Contracts		Permanent Technical/ Support Staff		Fixed-Term Technical/ Support Staff		Total	
Year	**2016**	**2023**	**2016**	**2023**	**2016**	**2023**	**2016**	**2023**	**2016**	**2023**	**2016**	**2023**	**2016**	**2023**
Retirement	37%	27%	2%	5%	0.2%	1%	0%	0%	38%	17%	5%	6%	6%	5%
New job in Academia/ a research institute in the UK	25%	10%	24%	5%	13%	18%	0%	0%	8%	17%	26%	19%	16%	14%
New job in Academia/ a research institute abroad	18%	34%	30%	1%	27%	23%	0%	0%	8%	0%	10%	13%	24%	18%
Move to a job in industry	2%	12%	20%	1%	7%	10%	0%	0%	8%	0%	5%	25%	7%	9%
Move to a job outside Scientific Research	3%	2%	9%	0%	3%	1%	0%	0%	0%	0%	15%	0%	4%	1%
End of contract	0%	2%	13%	27%	37%	34%	0%	0%	0%	17%	5%	31%	28%	28%
Death in Service	3%	0%	0%	0%	0.0%	0%	0%	0%	4%	17%	0%	0%	1%	0%
Unknown	12%	12%	2%	61%	14%	12%	100%	100%	33%	33%	32%	6%	14%	25%
Sample size	**67**	**41**	**46**	**79**	**490**	**203**	**6**	**6**	**24**	**6**	**19**	**16**	**666**	**352**

* Data are presented only for those university departments and research establishments that returned the questionnaire

Considering only the fixed-term researchers for whom destinations are known, 43% left to take up a new job in academia or in a research institute aboard, and 33% to take up a new job in academia or in a research institute in the UK. In other words, 76% of fixed term researchers in astronomy and geophysics moved on to roles within academia or research institutes. Only 19% of fixed-term research staff for whom destinations are known moved to roles in industry. These patterns are like those found in 2010 and 2016, suggesting that little has changed in the patterns of leaving destinations of research staff.

For permanent academic staff with known leaving destinations, the most common reason for leaving was retirement. 31% of those whose leaving destinations are known retired. 11% moved to other academic/research jobs in the UK and 40% to academic/research jobs abroad.

Table 6: Reasons for leaving employment in astronomy, solar system science, geophysics and cross-disciplinary research by Research Staff on Fixed-Term contracts whose reasons for leaving are known by gender, 2023*

Reason for leaving	Women	Men
Retirement	6%	0%
New job in Academia/a research institute in the UK	43%	28%
New job in Academia/a research institute abroad	34%	47%
Move to a job in industry	14%	22%
Move to a job outside Scientific Research	3%	3%
Death in Service	0%	0%
Total	**35**	**74**

* Data are presented only for those university departments and research establishments that returned the questionnaire

The numbers of women were too small to allow comparisons to be made with men except for fixed-term researchers. Comparing just those fixed-term researchers whose destinations are known (Table 6), women are more likely than men to leave for a new job in Academia/a research institute in the UK, and men are more likely to leave for a new job in Academia/a research institute in abroad or in industry. In contrast in 2010 and 2016, there were no significant differences observed in the known destinations of men and women.

3.5 Postgraduate research students

Table 7 shows the number of research students registered in each of the broad research areas, including those currently writing up, and Table 8 shows the equivalent data from 2016 and Table 9 from 2010

Table 7: Research students in Astronomy, Solar System Science and/or Solid Earth Geophysics, 2023

Broad research area	Research students in universities	Research students in research establishments	Total number of research students	Proportion of research students who are women
Astronomy	1154	7	1161	31.2%
Solar System Science	338	3	341	39.3%
Solid Earth Geophysics	409	8	417	42.0%
Cross Disciplinary	80	1	81	32.1%
Total	**1981**	**19**	**2000**	**34.9%**

Table 8: Research students in Astronomy, Solar System Science and/or Solid Earth Geophysics, 2016

Broad research area	Research students in universities	Research students in research establishments	Total number of research students	Proportion of research students who are women
Astronomy	1091	21	1112	30.0%
Solar System Science	168	9	177	26.0%
Solid Earth Geophysics	617	8	625	41.4%
Cross Disciplinary	99	0	99	29.3%
Total	**1975**	**38**	**2013**	**33.1%**

Table 9: Research students in Astronomy, Solar System Science and/or Solid Earth Geophysics, 2010

Broad research area	Research students in universities	Research students in research establishments	Total number of research students	Proportion of research students who are women
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	
Total	**1208**	**24**	**1232**	**32.7%**

The number of research students are higher in Astronomy and Solar System Science is higher in 2023 than 2016 and lower in Solid Earth Geophysics and cross disciplinary areas. The proportion of students who are women has risen in Solar System Science, and is about the same in the other three areas.

However, as shown in Table 10, the ratio of research students to academic staff has not changed in astronomy but has risen in Solar System Science and Solid Earth Geophysics so that those ratios are now in line with that for Astronomy. The ratio for Cross Disciplinary areas fell slightly to 0.8 although this may be a legacy of difficulties in classifying staff with a range of research interests as working in Cross Disciplinary areas, whilst research students' research classification is less ambiguous.

Table 10: Research students and permanent academic staff in universities in Astronomy, Solar System Science and/or Solid Earth Geophysics 2023 and comparisons with 2016 and 2010

Research area	Number of research students	Number of academic staff	Ratio of research students to academic staff 2023	Ratio of research students to academic staff 2016	Ratio of research students to academic staff 2010
Astronomy	1154	589	2.0	2.1	2.0
Solar System Science	338	146	2.3	1.3	1.3
Solid Earth Geophysics	409	219	1.9	1.4	1.2
Cross Disciplinary	80	106	0.8	1.1	1.2
Total	**1981**	**1060**	**1.9**	**1.7**	**1.9**

Table 11 shows that 63% of research students are full-time and domiciled in the UK. Only 5% of students are studying part-time. The proportion of women among non-UK domiciled (permanently resident) students (43%) is higher than that among UK-domiciled students (31%). This is the same pattern seen in 2016 and 2010, albeit the proportion of UK-domiciled students who are women fell from 32%.

Table 11: Number of research students studying part and full-time, and their domicile in Astronomy, Solar System Science and/or Solid Earth Geophysics by gender, 2023 and a comparison with 2016

Mode of study and domicile of research students	Research Area	Number of research students		2023		2016	
		Women	Men	Proportion of research students who are women	Proportion of total population	Proportion of research students who are women	Proportion of total population
Full Time, UK Domiciled Post Graduate Students	Astronomy	64	193	25%	36%	42%	25%
	Solar System Science	35	58	38%	13%	7%	38%
	Solid Earth Geophysics	36	46	44%	12%	14%	44%
	Cross Disciplinary	2	10	17%	2%	3%	17%
	Total	**137**	**307**	**31%**	**63%**	**66%**	**31%**
Full Time, Other-EU Domiciled Post Graduate Students	Astronomy	26	33	44%	8%	7%	44%
	Solar System Science	11	8	58%	3%	1%	58%
	Solid Earth Geophysics	16	29	36%	6%	6%	36%
	Cross Disciplinary	0	0	-	0%	0%	-
	Total	**53**	**70**	**43%**	**17%**	**13%**	**43%**
Full Time, Non-UK, non-EU Domiciled Post Graduate Students	Astronomy	30	37	45%	9%	12%	45%
	Solar System Science	1	7	13%	1%	1%	13%
	Solid Earth Geophysics	8	14	36%	3%	5%	36%
	Cross Disciplinary	2	2	50%	1%	1%	50%
	Total	**41**	**60**	**41%**	**14%**	**18%**	**41%**
Part time Students Post Graduate Students (both UK and non-UK Domiciled)	Astronomy	6	22	21%	4%	2%	21%
	Solar System Science	0	3	0%	0%	1%	0%
	Solid Earth Geophysics	5	2	71%	1%	1%	71%
	Cross Disciplinary	0	0	-	0%	0%	-
	Total	**11**	**27**	**29%**	**5%**	**4%**	**29%**

Total Post Graduate Students	Astronomy	126	285	31%	58%	63%	31%
	Solar System Science	47	76	38%	17%	10%	38%
	Solid Earth Geophysics	65	91	42%	22%	24%	42%
	Cross Disciplinary	4	12	25%	2%	3%	25%
	Total	**242**	**464**	**34%**	**100%**	**100%**	**34%**

Data in Table 12 show the distribution of PhD students by year of study drawn from the returned questionnaires. 45% of the research students in 2023 are in their 2nd year compared to 25% in 2016 and 2010. It is not known why this is the case. The data do suggest that, as in 2010 and 2016, most students complete their studies within 4 years, and that most students do work on into a fourth year.

Table 12: Distribution of PhD student by year of study and broad research area 2023 and a comparison with 2016 and 2010*

Research Area	Year of study of PhD students					
	1st Year	2nd Year	3rd Year	4th Year	5th Year	Writing up
Astronomy	62	196	65	49	14	25
Solar System Science	31	34	21	16	12	9
Solid Earth Geophysics	18	79	21	19	12	7
Cross Disciplinary	4	6	2	3	0	1
Total	115	315	109	87	38	42
Proportion of students in each year of study 2023	16.3%	44.6%	15.4%	12.3%	5.4%	5.9%
Proportion of students in each year of study 2016	24.6%	24.6%	23.4%	14.7%	2.6%	10.1%
Proportion of students in each year of study 2010	26.3%	25.4%	20.8%	17.2%	2.2%	8.2%

* Years of study are only known for students studying in universities and research institutes that returned questionnaires.

There were significant increases in the number of postgraduate research students between 1998 and 2016, but total number have remined approximately the same since then, albeit there has been a fall in the number of Solid Earth Geophysics students and an increase in the number of Solar System Science students.

3.6 Total size of communities

The total sizes of the communities with interests in the broad research areas under consideration in this study and in 2016 and 2010 are shown in Table 13. The sizes of the communities were calculated by summing all staff and research students in universities and research institutes.

Table 13: The full-time equivalent sizes of the research communities (totals of research staff and research students in universities and research establishments) in astronomy and geophysics

Broad research area	Community size 2023	Community size 2016	Community size 2010
Astronomy	2597	2523	1689
Solar System Science	790	429	371.2
Solid Earth Geophysics	1611	2050.5	357.2
Cross-disciplinary	388	381	203.8

The calculated sizes of the Astronomy and Solar System Science communities have increased while that of the Solid Earth Geophysics community has decreased, in part because of an erroneous questionnaire return in 2016.

The size of the astronomy and solar system science communities is lower than in reality as data from two research establishments could not be collected.

As was noted earlier, the increase in the geophysics community between 2010 and 2016 was in part because the 2016 study used websites more widely to collect data, in particular from research establishments. The fall in the size of the solid Earth geophysics community between 2016 and 2023 warranted further investigation. An institution by institution/research establishment by research establishment examination of the solid Earth geophysics data suggested that in 2016 at least one institution significantly over reported numbers of geophysics staff and students. Although this partly explains the falls in the size of the geophysics community, it does not explain the explain the fall of over 400 suggesting that at even with the overreporting in 2016, the size of the geophysics community fell between 2016 and 2023.

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.

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 through their networks and using social media.

It is not known whether all the departments and research establishments approached distributed the link to the survey.

1251 individuals started the on-line individual questionnaire, and 956 respondents provided enough information for some analysis. The 956 included: 478 academic/research staff from 93 departments/research units in 65 institutions/research organisations; 37 technical staff from 25 departments/research units in 23 institutions/research organisations; 175 postdoctoral researchers from 53 departments/research units in 40 institutions/research organisations; and 291 research students from 49 departments/research units in 35 institutions/research organisations began the questionnaire. Some of these respondents did not complete the questionnaire but the responses they did submit have been analysed. Data for 6 long-term visitors were also analysed.

23 non-research active Honorary/Retired/Emeritus Staff, 8 Hourly Paid/ Casual staff and 76 respondents who did not fall into any of the categories for analysis began the survey. These respondents were not invited to provide detailed information.

4.1 The sample

Table 14 shows a breakdown of the roles and gender of respondents who started the questionnaire; note that although the respondents listed completed at least some of the questionnaire they did not necessarily complete the questionnaire.

Table 14: The roles and gender of respondents to the individual questionnaire, 2023

Role/Position of respondents	Count of respondents by gender										Total
	Women		Men		Non-binary		Other		Do not wish to say		
	N	%	N	%	N	%	N	%	N	%	
Professor	37	20%	137	74%	4	2%	0	0%	8	4%	186
Reader	19	40%	27	56%	1	2%	0	0%	1	2%	48
Senior Lecturer or equivalent (e.g. Associate Professor)	23	25%	65	71%	0	0%	0	0%	3	3%	91
Lecturer or equivalent (e.g. Assistant Professor)	27	44%	30	48%	1	2%	0	0%	4	6%	62
Permanent Research Fellow/Staff (University)	7	35%	12	60%	0	0%	0	0%	1	5%	20
Research Fellow/ Staff on open-ended contract (Research Facility/ Research Institute)	12	27%	32	73%	0	0%	0	0%	0	0%	44
Honorary/Retired/Emeritus Staff (Research active)	4	8%	46	92%	0	0%	0	0%	0	0%	50
Long-term visitor	3	43%	2	29%	0	0%	1	14%	1	14%	7
Technical or support staff (excl. admin)	12	32%	24	65%	1	3%	0	0%	0	0%	37
Postdoctoral Research Associate	74	42%	96	54%	2	1%	0	0%	5	3%	177
Postgraduate Research Student	121	42%	147	51%	20	7%	0	0%	3	1%	291
Total	**339**	**33%**	**618**	**61%**	**29**	**3%**	**1**	**0%**	**26**	**3%**	**1013**

Data in Table 14 suggest that the proportion of respondents who are women by role/position is in line with the proportion of women in the general population of astronomers and geophysicists.

Table 15: Comparison of the respondents to the individual questionnaire, 2023, and the population of astronomy and geophysics researchers established for university departments and research establishments

Role/Position	Individual questionnaire population 2023		Departmental/ Research establishment questionnaire population 2023	
	N	%	N	%
Professor	186	18.4%	733	15.5%
Reader	48	4.7%	387	8.2%
Senior Lecturer or equivalent (e.g. Associate Professor)	91	9.0%		
Lecturer or equivalent (e.g. Assistant Professor)	62	6.1%	213	4.5%
Permanent Research Fellow/Staff	20	2.0%	178	3.8%
Research Fellow/Staff on open-ended contract (Research Facility/Research Institute)	44	4.3%	-	-
Honorary/Retired/Emeritus Staff (Research active)	50	4.9%	-	-
Research Staff on Unknown Contracts	-	-	41	0.9%
Postdoctoral Research Associate	177	17.5%	849	18.0%
Total Research Staff	177	17.5%	888	18.8%
Long-term visitor	7	0.7%	59	1.2%
Technical or support staff (excl. admin)	37	3.7%	293	6.2%
Postgraduate Research Student	291	28.7%	2000	42.3%
Other Scientific and Technical Staff	-	-	14	0.3%
Total	**1013**	**100.0%**	**4726**	**100.0%**

A comparison of the distribution of the roles/positions with the population in Table 1 is shown in Table 15. These data suggest that academic staff are overrepresented in the sample and post graduate research students are underrepresented. However, since the data for 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.

6% of permanent staff respondents reported that they had a disability.

Table 16 shows the nationalities of respondents: 74% of permanent staff are British, 15% are from EU countries, 3% are from the USA, and 5% are from other countries. In 2016 and 2010, 73% and 78% of permanent staff were British, respectively, 19% and 12% were from other EU countries, 3% and 2% were from the USA, and 6% and 7% were from other countries. The data show that the proportion of permanent staff respondents who are British has risen by 1% and those from the EU has decreased by 4%, possibly because of Brexit.

Table 16: Nationalities of permanent staff responding to the individual questionnaire, 2023

Role/Position of respondents	Distribution of permanent staff between nationalities				
	British (inc. dual nationals)	European Union	USA	Other	Total
Professor	79%	12%	1%	4%	186
Reader	52%	31%	8%	2%	48
Senior Lecturer or equivalent (e.g. Associate Professor)	65%	19%	3%	11%	91
Lecturer or equivalent (e.g. Assistant Professor)	63%	19%	5%	8%	62
Permanent Research Fellow/Staff (University)	76%	15%	2%	5%	41
Research Fellow/ Staff on open-ended contract (Research Facility/ Research Institute)	83%	17%	0%	0%	23
Honorary/ Retired/ Emeritus Staff (Research active)	96%	2%	2%	0%	50
Total	**74%**	**15%**	**3%**	**5%**	**507**

Table 17 shows that 94% of respondents that indicated their ethnicity specified their ethnicity as White, with 67% describing themselves as White (British), and 27% as Other

White. The Labour Force Survey[10] gives the breakdown of the working population as 85.0% White, with 76.5% White British, so the proportion of permanent staff respondents who are White is higher than the UK's working population, although the proportion who are White British is lower than in the UK working population.

Considering only British respondents, 97% are White. The figure was 95% in 2016.

Results from the 2021 census for England and Wales, and for Northern Ireland, and the 2022 Scottish census combined showed that 83.0% of the population of the were White.

[10] Labour market status by ethnic group, ONS, 2023 (A09: Labour market status by ethnic group - Office for National Statistics (ons.gov.uk))

Table 17: Ethnicity of all permanent staff responding to the individual questionnaire and who indicated their ethnicity, 2023

Role/Position of respondents	White (British)	Other White	Asian: Indian	Asian: Bangladeshi	Asian: Pakistani	Asian: Chinese	Other Asian	Black: African	Black: Caribbean	Mixed: White and Asian	Mixed: White and Black African	Mixed: White and Black Caribbean	Other Mixed Background	Any other ethnic group	Total
Professor	72%	23%	0%	0%	0%	1%	2%	0%	0%	0%	2%	0%	1%	1%	176
Reader	39%	50%	4%	2%	2%	0%	2%	0%	0%	0%	0%	0%	0%	0%	46
Senior Lecturer or equivalent (e.g. Associate Professor)	59%	30%	5%	0%	0%	1%	0%	0%	0%	0%	1%	0%	3%	1%	87
Lecturer or equivalent (e.g. Assistant Professor)	61%	30%	2%	0%	0%	0%	0%	0%	0%	2%	0%	0%	4%	2%	57
Permanent Research Fellow/ Staff (University)	70%	28%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	40
Research Fellow/ Staff on open-ended contract (Research Facility/ Research Institute)	78%	17%	0%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%	23
Honorary/ Retired/ Emeritus Staff (Research active)	88%	13%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	48
Total	**67%**	**27%**	**1%**	**0%**	**0%**	**1%**	**1%**	**0%**	**0%**	**0%**	**1%**	**0%**	**1%**	**1%**	**477**

Compared to the ethnic diversity of permanent staff in astronomy and geophysics to that in 2016, the proportion of respondents who are White (British) has risen from 62% to 68% and Ethnic Minority representation remains low, especially among British respondents, that is, 4% compared to 17.8% in England, Wales and Northern Ireland in 2021.

Respondents were asked about their religious beliefs. The results are shown in Table 18 along with those from 2016. Table 18 also shows the most recent UK census data. The pattern of religious beliefs has changed little since 2016 with 72% of respondents stating that they have no religion/were atheists, and 25% reporting that they were Christian in 2023 compared to 27% in 2016. The pattern of reported religious belief is the same if the respondents are restricted to British nationals only.

The 2021 census data for England and Wales, and Northern Ireland, and the 2022 Scottish census data shows a very different pattern with 37.8% reporting that they had no religion. 46.5% of the population described themselves as Christian, 6.0% as Muslim and 1.6% as Hindu, and 2.3% other religions. Permanent staff respondents to the survey were almost twice as likely as the population of the UK to report that they had no religion.

Table 18: Religions of permanent staff responding to the individual questionnaire, 2016 and 2023

Religion	2016		2023		Census 2021 England and Wales	Census 2021 Northern Ireland*	Census 2022 Scotland
	Number	Distri-bution	Number	Distri-bution			
No religion/Atheist	237	75.2%	332	72.2%	37.2%	17.4%	51.1%
Christian	89	28.3%	115	25.0%	46.2%	79.7%	38.8%
Buddhist		0.0%	3	0.7%	0.5%	0.1%	0.3%
Spiritual	-	0.0%	2	0.4%			
Hindu	1	0.3%	2	0.4%	1.7%	0.2%	0.6%
Muslim	1	0.3%	3	0.7%	6.5%	0.5%	2.2%
Humanist	1	0.3%	1	0.2%			
Sikh	-	0.0%	1	0.2%	0.9%		0.2%
Jewish	-	0.0%	1	0.2%	0.5%		0.1%
Do not wish to say	43		47				
Other Religions/ Not answered/ Does not Apply					6.6%	2.1%	6.2%
Total	**358**	**358**	**507**	**460**	**59,597,583**	**1,903,181**	**5,439,842**

* The Northern Ireland data are not disaggregated as much as the data for the other nations

Table 19 presents data on the gender and working mode of permanent staff. Overall, 14% of women and 18% of men work part-time but examination of the data by grade/role shows that among professors, readers and senior lecturers women are more likely to work part-

time than men and among lecturers men are more likely to be part-time. Considering the same roles combined, 10% of both women and men work part-time. In 2016, for the same combined roles 13% of women and 10% of men worked part time. For comparison, the Labour Force Survey data for employees shows that the part-time rate for women is 36% and for men is 12%.[11]

The data suggest that there has been little change in the proportions of permanent staff working part-time and, as in 2016, among respondents who are Professors, Readers, Senior Lecturers and Lecturers, women are much less likely to work part-time than women in the general population whereas men's part-time working rate is in line with that of the general population.

[11] Labour Force Survey, ONS, 2023 (EMP01 SA: Full-time, part-time and temporary workers (seasonally adjusted) - Office for National Statistics (ons.gov.uk))

Table 19: Gender and working mode of permanent staff responding to the individual questionnaire, 2023

Role/Position of respondents	Counts of permanent staff by gender and working mode											
	Women			Men			Other/ Do not wish to say			Overall		
	Full-time	Part-time	% Part-time	Full-time	Part-time	% Part-time	Full-time	Part-time	% Part-time	Full-time	Part-time	% Part-time
Professor	31	5	14%	117	17	13%	10	0	0%	158	22	12%
Reader	16	3	16%	24	3	11%	1	1	50%	41	7	15%
Senior Lecturer or equivalent (e.g. Associate Professor)	21	2	9%	61	4	6%	3	0	0%	85	6	7%
Lecturer or equivalent (e.g. Assistant Professor)	26	1	4%	28	2	7%	4	0	0%	58	3	5%
Professors, Readers, Senior Lecturers and Lecturers combined	94	11	10%	230	26	10%	18	1	5%	342	38	10%
Permanent Research Fellow/ Staff (University)	10	1	9%	24	5	17%	1	0	0%	35	6	15%
Research Fellow/Staff on open-ended contract (Research Facility/Research Institute)	6	2	25%	14	1	7%	0	0	-	20	3	13%
Honorary/ Retired/ Emeritus Staff (Research active)	0	3	100%	9	30	77%	0	0	-	9	33	79%
Long-term visitor	2	1	33%	2	0	0%	0	0	-	4	1	20%
Total	**112**	**18**	**14%**	**279**	**62**	**18%**	**19**	**1**	**5%**	**410**	**81**	**16%**

Table 20 gives the reported sexual orientation of permanent staff respondents. Overall, 83% of staff reported themselves as heterosexual or straight, 3% as gay or lesbian, 3% as bisexual, 1% as other and 11% did not wish to say. The census data are also shown. A smaller proportion of respondents in the national survey did not give their sexual orientation or reported it as "other". Comparing just those who reported their sexual orientation, 92% of staff reported themselves as heterosexual or straight compared to 96.5% in the national data, 3% as gay or lesbian compared to 1.6% nationally, 3% as bisexual compared to 1.3% nationally and 1% as other compared to 0.2% of the national population. The declared sexual orientation of the survey respondents suggest that they are more likely to be gay or lesbian, bisexual or other orientation than the national population.

Table 20: Sexual orientation of permanent staff responding to the individual questionnaire, 2023, and the comparable Office of National Statistics Data

Sexual Orientation	Permanent staff			England and Wales Census Data 2021		Northern Irish Census Data 2021		Scottish Census Data 2022	
	Number	Distribution of all	Distribution of known	Distribution of all	Distribution of known	Distribution of all	Distribution of known	Distribution of all	Distribution of known
Heterosexual or straight	419	82.6%	92.5%	89.4%	96.6%	90.0%	97.7%	87.8%	95.6%
Gay or lesbian	15	3.0%	3.3%	1.5%	1.7%			1.8%	1.9%
Bisexual	13	2.6%	2.9%	1.3%	1.4%	21.%	2.3%	1.8%	1.9%
Other	6	1.2%	1.3%	0.2%	0.2%			0.5%	0.6%
Do not wish to say	54	10.7%		7.5%		7.9%		8.2%	
Total	**507**	**507**	**453**						

Table 21 presents data on the numbers of children permanent staff have, broken down by whether the children are pre-school age, school age (5 to 18 years old) or grown up (above 18 years old) and role. It was not specified to respondents whether or not they ought to include stepchildren and adopted children.

Table 22 presents shows the total number of children of respondents by role and sex. The number and age of children increases with seniority which is, of course, related to the fact that more senior staff are on average older. As in 2010 and 2016, among professors a larger proportion of women than men do not have children, although the difference is not statistically significant.[12] More generally, considering all permanent working staff,

[12] X^2 test, P>0.05

(professors, readers, senior lecturers, lecturers and permanent researchers), 47% of women and 34% of men do not have children but again the difference is not statistically significant.

Table 23 present data on the total number of children by age and sex of respondents. For all the age bands examined, women were less likely than men to have children although none of the differences were statistically significant.

The childless rates of women by birth year do vary. [13] Data are available for women born in 1920 onwards. The assumption is that women's childbearing years are up to the age of 45. Childless rates for women born in 1953 onwards (i.e. aged 70 in 2023) gradually increase from 15% peaking at 20% for women born in the early 60s, before falling to 18% for women born in 1975. Thereafter, childless rates increase as birth year increases such that for women born in 1983 the childless rate is 20%, those born in 1993, 64% are childless, and those born in 2003, 99% are childless.

The data in Table 23 suggest that in every age band, the proportions of women astronomers/geophysicists who do not have children is much higher than that in the general population.

[13] Childbearing for women born in different years, England and Wales: 2022, Office of National Statistics

Table 21: Number of children of permanent staff responding to the individual questionnaire, 2023

Number and ages of children				Number of respondents by role/position							
Number of pre-school age children (under 5 years old)	Number of school age children (5 to 18 years old)	Number of grown up children (above 18 years old)	Total number of children	All	Professor	Reader	Senior Lecturer or equivalent (e.g. Associate Professor)	Lecturer or equivalent (e.g. Assistant Professor)	Permanent Research Fellow/ Staff (University)	Honorary/ Retired/ Emeritus Staff (Research active)	Long-term visitor
0	0	0	0	167	52	16	42	34	7	14	2
		1	1	14	8	1	1	1	1	2	0
		2	2	68	36	4	1	1	1	24	1
		3	3	16	9	0	0	0	1	6	0
		4	4	3	2	0	0	0	0	1	0
		5	5	1	0	0	0	0	0	1	0
	1	0	1	36	16	7	9	2	1	1	0
		1	2	13	11	0	2	0	0	0	0
		2	3	2	2	0	0	0	0	0	0
	2	0	2	43	23	5	10	3	1	0	1
		1	3	1	1	0	0	0	0	0	0
	3	0	3	11	6	4	0	1	0	0	0
	4	0	4	1	0	0	0	1	0	0	0
1	0	0	1	30	3	3	12	9	2	0	1
		1	2	1	1	0	0	0	0	0	0
	1	0	2	15	3	3	6	2	1	0	0
	2	0	3	1	0	0	0	1	0	0	0
		1	4	1	1	0	0	0	0	0	0

2	0	0	2	14		3	4	3	4	0	0
	2	0	4	1	1	0	0	0	0	0	0
3	2	0	5	1	0	0	0	0	0	0	1
		1	6	1	0	0	0	0	0	1	0
5	0	1	6	1	1	0	0	0	0	0	0
Do not wish to say				19	8	2	4	4	1	0	0
Total				**442**	**176**	**46**	**87**	**58**	**19**	**50**	**6**

Table 22: Number of children of permanent staff responding to the individual questionnaire by role and gender, 2023

Number of Children (any age)	Professor		Reader		Senior Lecturer or equivalent (e.g. Associate Professor)		Lecturer or equivalent (e.g. Assistant Professor)		Permanent Research Fellow/Staff (University)		Honorary/ Retired/ Emeritus Staff (Research active)		Long-term visitor		All Respondents	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
0	40%	28%	28%	38%	55%	45%	67%	50%	29%	42%	50%	26%	67%	0%	47%	34%
1	23%	13%	22%	27%	18%	28%	15%	27%	14%	25%	25%	4%	0%	0%	19%	18%
2	31%	44%	39%	31%	27%	27%	15%	17%	57%	25%	25%	50%	33%	50%	29%	37%
3	6%	12%	11%	4%	0%	0%	4%	3%	0%	8%	0%	13%	0%	0%	4%	8%
4	0%	3%	0%	0%	0%	0%	0%	3%	0%	0%	0%	2%	0%	0%	0%	2%
5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	50%	0%	1%
6	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%
Total	**35**	**134**	**18**	**26**	**22**	**64**	**27**	**30**	**7**	**12**	**4**	**46**	**3**	**2**	**116**	**314**

Table 23: Number of children of permanent staff responding to the individual questionnaire by age and gender, 2023

Number of Children (any age)	20-29 Years		30-39 Years		40-49 Years		50-59 Years		60+ Years	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
0	-	100%	61%	53%	36%	25%	53%	33%	38%	33%
1	-	0%	15%	22%	25%	33%	24%	11%	8%	8%
2	-	0%	22%	24%	32%	34%	24%	38%	46%	45%
3	-	0%	2%	0%	7%	5%	0%	16%	8%	8%
4	-	0%	0%	0%	0%	2%	0%	1%	0%	3%
5	-	0%	0%	0%	0%	1%	0%	0%	0%	1%
6	-	0%	0%	0%	0%	0%	0%	0%	0%	1%
Total	**0**	**2**	**41**	**49**	**44**	**83**	**17**	**73**	**13**	**106**

Table 24: Number of children of permanent staff responding to the individual questionnaire by age and gender, 2016

Number of Children (any age)	20-29 Years		30-39 Years		40-49 Years		50-59 Years		60+ Years	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
0	100%	100%	58%	49%	31%	40%	30%	41%	40%	20%
1	0%	0%	25%	29%	13%	13%	30%	7%	20%	10%
2	0%	0%	14%	21%	50%	32%	30%	30%	40%	48%
3	0%	0%	3%	0%	6%	13%	10%	18%	0%	18%
4	0%	0%	0%	0%	0%	3%	0%	4%	0%	5%
5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	**1**	**5**	**36**	**85**	**16**	**78**	**10**	**71**	**5**	**40**

Table 25: Number of children of permanent staff responding to the individual questionnaire by age and gender, 2010

Number of Children (any age)	20-29 Years		30-39 Years		40-49 Years		50-59 Years		60+ Years	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
0	0%	-	73%	54%	41%	42%	38%	32%	20%	14%
1	0%	-	13%	13%	27%	12%	38%	12%	20%	6%
2	0%	-	13%	23%	27%	33%	0%	39%	20%	56%
3	0%	-	0%	10%	5%	12%	25%	12%	40%	16%
4	0%	-	0%	0%	0%	2%	0%	5%	0%	6%
5	0%	-	0%	0%	0%	0%	0%	0%	0%	2%
5+	0%	-	0%	0%	0%	0%	0%	0%	0%	0%
Total	**1**	**0**	**15**	**52**	**22**	**110**	**8**	**57**	**5**	**50**

Among those respondents who specified their gender, 25 men (8%) and 44 (37%) women report that they have had one or more career breaks totalling more than 3 months. Most of the career breaks were for parental leave, as shown in Table 26.

Considering only those permanent academic staff who report having one or more children, the proportions of those staff who report having at least one career break of three months or longer are shown in Table 27. Women are much more likely than men to have taken parental leave of three months or more. It is interesting to consider why overall a greater proportion of women with at least one child have not taken at least one career break of three months or more for parental leave. It is possible that some women took less than three months, or that some women were not working when they had children. There does not seem to be any link to the nationality of the respondents.

Table 26: Reasons for career breaks reported by permanent academic staff who responded to the individual questionnaire by role and gender, 2023

Role/Position of respondents	Parental Leave		Caring for a family member		Illness		Other	
	Women	Men	Women	Men	Women	Men	Women	Men
Professor	8	18	0	0	0	4	1	2
Reader	3	8	0	0	1	0	1	1
Senior Lecturer or equivalent (e.g. Associate Professor)	2	7	1	0	1	0	0	0
Lecturer or equivalent (e.g. Assistant Professor)	0	4	0	0	0	2	0	0
Permanent Research Fellow/ Staff (University)	1	4	0	0	0	0	3	0
Research Fellow/ Staff on open-ended contract (Research Facility/ Research Institute)	1	2	0	1	0	1	0	0
Honorary/ Retired/ Emeritus Staff (Research active)	1	0	0	0	1	0	5	0
Total	**16**	**43**	**1**	**1**	**3**	**7**	**10**	**3**

Table 27: Proportions of permanent staff who responded to the individual questionnaire who have children and reported taking a career break of three months or longer for parental leave, 2023

Role/Position of respondents	Women			Men		
	Number with at least one child	Parental leave reported	Proportion taking parental leave	Number with at least one child	Parental leave reported	Proportion taking parental leave
Professor	21	18	86%	97	8	8%
Reader	13	8	62%	16	3	19%
Senior Lecturer or equivalent (e.g. Associate Professor)	10	7	70%	35	2	6%
Lecturer or equivalent (e.g. Assistant Professor)	9	4	44%	15	0	0%
Permanent Research Fellow/Staff (University)	8	4	50%	16	1	6%
Research Fellow/Staff on open-ended contract (Research Facility/Research Institute)	4	2	50%	9	1	11%
Honorary/Retired/Emeritus Staff (Research active)	2	0	0%	34	1	3%
Long-term visitor	1	0	0%	2	0	0%
Total	**68**	**43**	**63%**	**224**	**16**	**7%**

Respondents were asked to estimate how their time is divided between a number of activities. The results are shown in Table 28 and for comparison the 2016 results are shown in Table 29.

All grades of academic staff spend between 26% and 36% of their time on research activities. However, the proportion of time spent on research has fallen for all four groups since 2016, with the largest falls for Readers and Senior Lecturers. The falls seems to be accounted for by increases in most other areas.

As in 2016 Readers, Senior Lecturers and Lecturers spend more time on undergraduate teaching (between 26 and 31%) than professors (21%), and all staff spend around 10 to 15% of their time on postgraduate teaching. The proportion of time spent on administration and on external professional activities increases with seniority but there is less difference between professors, readers and senior lecturers than in 2016: these groups spend about 20% of their time on administration. Staff spend about 5% of their time on public engagement and outreach.

Table 28: How permanent staff respondents divide their time between different activities, 2023

Role/Position of respondents	N	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	179	36%	21%	8%	21%	7%	4%	3%
Reader	40	28%	31%	11%	20%	5%	5%	1%
Senior Lecturer or equivalent (e.g. Associate Professor)	82	26%	31%	11%	20%	6%	4%	2%
Lecturer or equivalent (e.g. Assistant Professor)	56	33%	26%	15%	16%	4%	4%	2%
Permanent Research Fellow/Staff (University)	37	64%	6%	4%	10%	3%	3%	9%
Research Fellow/Staff on open-ended contract (Research Facility/ Institute)	20	53%	1%	3%	16%	6%	4%	19%
Honorary/Retired/Emeritus Staff (Research active)	43	67%	0%	1%	3%	9%	9%	11%
Long-term visitor	6	35%	2%	4%	17%	18%	6%	18%

Table 29: How permanent staff respondents divide their time between different activities, 2016

Role/Position of respondents	N	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	129	38%	20%	9%	19%	8%	4%	2%
Reader	52	34%	28%	10%	16%	7%	6%	0%
Senior Lecturer or equivalent (e.g. Associate Professor)	53	33%	30%	9%	16%	5%	6%	2%
Lecturer or equivalent (e.g. Assistant Professor)	56	36%	26%	11%	15%	3%	5%	4%
Permanent Research Fellow/Staff (University)	20	68%	4%	8%	7%	4%	3%	7%
Research Fellow/Staff on open-ended contract (Research Facility/ Institute)	40	60%	6%	6%	8%	2%	7%	10%
Long-term visitor	5	83%	0%	0%	16%	0%	1%	0%

In contrast to academic staff, staff in other roles spend a higher proportion of their time undertaking research. In universities, research fellows spend about 64% of their time on research and 6% of their time on undergraduate teaching, 4% on postgraduate teaching and 10% on administration. Outside universities, research staff report spending 53% of their time on research and 16% of their time on administration.

It was observed in 2016 that overall, and in particular for university academic staff, the way in which respondents divided their time between different areas had not changed greatly since 2010 with the exception of an increase in the time Permanent Research Fellows/Staff in universities reported spending on research. Similarly, there has been relatively little change since 2016 but it is notable that most groups are spending less time on research in 2023 than in 2016 and the amount of time spent on administration has increased for all groups.

Table 30: Research interests of permanent staff, 2023

Broad research area*	Count of permanent research staff by gender (Distribution within each gender category)				
	Men (N=343)	Women (N=131)	Non-binary (N=6)	Unknown (N=17)	Total (N=497)
Astronomy: Astronomy and/or Astrophysics	223 (65%)	79 (60%)	4 (67%)	11 (65%)	317 (64%)
Astronomy: Particle Astrophysics	25 (7%)	4 (3%)	0 (0%)	2 (12%)	31 (6%)
Solar System: Planetary Science	48 (14%)	23 (18%)	2 (33%)	2 (12%)	75 (15%)
Solar System: Earth Observation	8 (2%)	2 (2%)	0 (0%)	0 (0%)	10 (2%)
Solar System: Atmospheric Science	14 (4%)	0 (0%)	0 (0%)	1 (6%)	15 (3%)
Solar System: The Sun	36 (10%)	10 (8%)	0 (0%)	2 (12%)	48 (10%)
Solar System: Solar-Terrestrial Physics	38 (11%)	17 (13%)	0 (0%)	3 (18%)	58 (12%)
Solar System: Cross Discipline Topics	12 (3%)	3 (2%)	0 (0%)	0 (0%)	15 (3%)
Geophysics: Solid Earth Geophysics	32 (9%)	16 (12%)	0 (0%)	0 (0%)	48 (10%)
Other Related Subject	8 (2%)	0 (0%)	0 (0%)	0 (0%)	8 (2%)

* Respondents could indicate more than one research area

Table 30 shows the broad research areas which permanent staff work in. Respondents could indicate more than one research area: 362 (71%) respondents indicated that they research a single area; 103 (20%) indicated 2 research areas; 26 (5%) indicated 3 areas; and 6 (1%) respondents indicated 4 or more areas.

65% (2016: 78%) of respondents indicated that they have research interests in an *Astronomy* research area with 64% (2016: 70%) of the whole sample indicating an interest in *Astronomy and/or Astrophysics* and 6% (2016: 7%) indicating an interest in *Particle Astrophysics,* 33% (2016: 25%) indicated an interest in some aspects of *Solar System Science*, and 10% (2016: 12%) indicated an interest in *Geophysics*. The increase in the proportion of staff indicating research interests in *Solar System Science* is not at the expense of a fall in

interest in other areas. Instead, the increase indicates that more respondents are reporting interests in both *Astronomy* and *Solar System Science* research areas.

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

As in 2010 and 2016, the data are presented in the form of the number of full-time equivalent staff (FTEs) working on each research area and wavelength. To calculate these figures, the proportion of research time each respondent reported spending on each activity was weighted by the proportion of the total time that that respondent reported spending on research.

Table 31 indicates the relative effort expended on each research area by all permanently employed respondents with research interests in astronomy and Figure 14 shows the proportion of total effort expended on each general activity for astronomy in 2023.

Figure 15 shows the proportion of total effort expended on each general activity for astronomy in 2016 for comparison.

Following a similar pattern to that in 2016, in 2023 in astronomy 31% of effort is expended on *Theory and numerical modelling* and 34% is expended on *Data analysis*. Smaller proportions of effort are expended on *Observation/Data Collection* (11%), *Data reduction* (9%), and *Instrumentation* (10%). Significantly less effort is expended in *Facility operation and maintenance* (3%) and *Other* activities (3%). Activities are split between *Ground-based* (54%), *Space* (38%) and *Other* (8%) areas. So, between 2016 and 2023, there has been little change in the relative distribution of research effort in Astronomy. In fact extending the comparison to 2010 also shows that there has been little change.

Table 31: The distribution of research effort of respondents with permanent roles with interests in astronomy shown as full-time equivalents, 2023 (N=458)*

General research area	Research effort expended (FTEs)			
	Ground-based	Space	Other	Totals
Theory and numerical modelling	22.0	16.6	9.5	48.0
Observation/Data Collection	10.2	6.4	0.3	16.9
Instrumentation	9.7	5.2	0.4	15.2
Data reduction	9.5	4.9	0.0	14.4
Data analysis	27.6	24.4	0.9	53.0
Facility operation & maintenance	3.0	1.6	0.0	4.5
Other	2.6	0.8	1.8	5.2
Totals	**84.6**	**59.8**	**12.8**	**157.3**

* Table 31 contains information on all respondents who indicated a broad research interest in an astronomy-related research areas. There is some overlap with the respondents included in Table 33 who indicated research interests in both astronomy and geophysics.

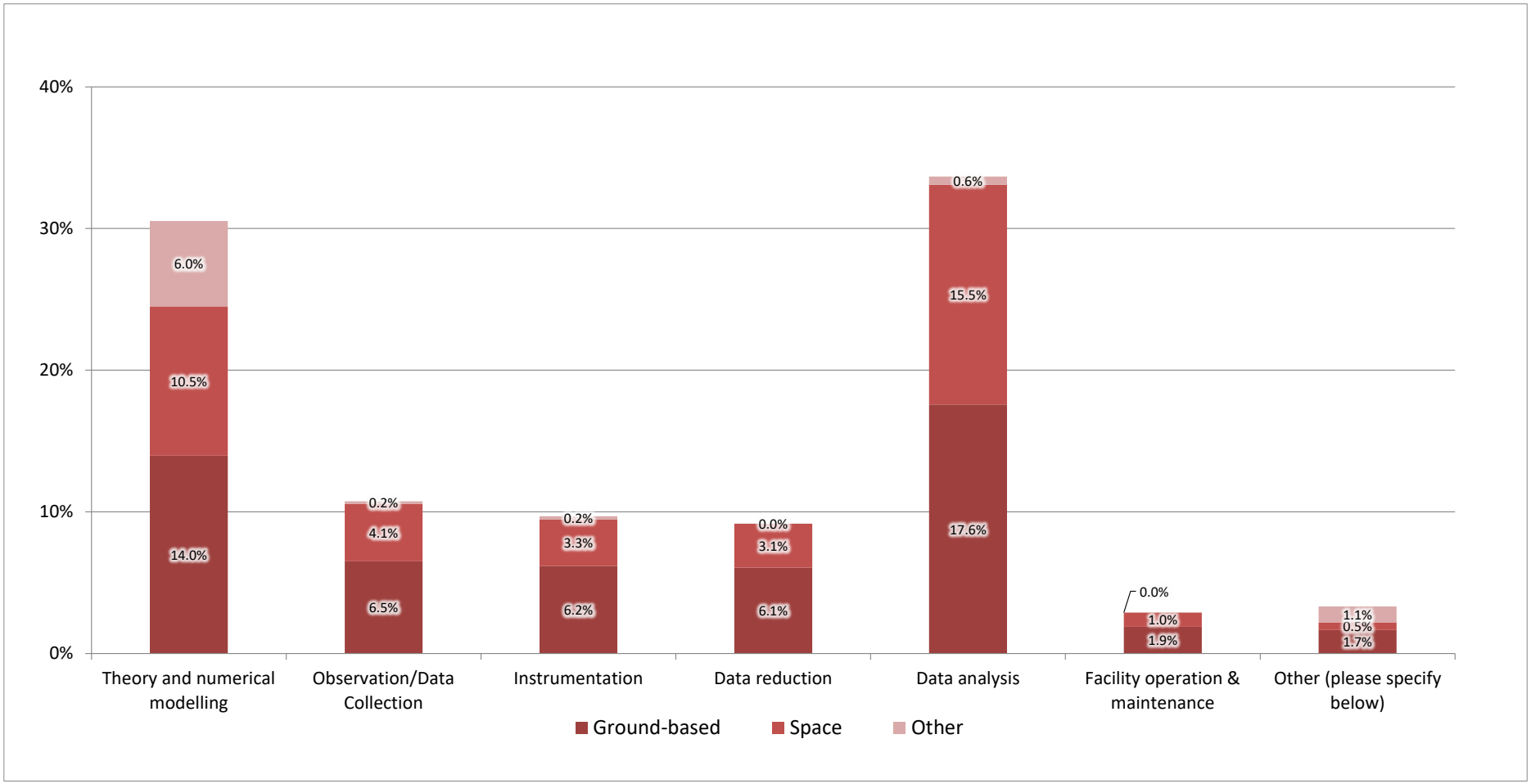

Figure 14: Proportion of effort spent on various general research activities by respondents with research interests in astronomy, 2023

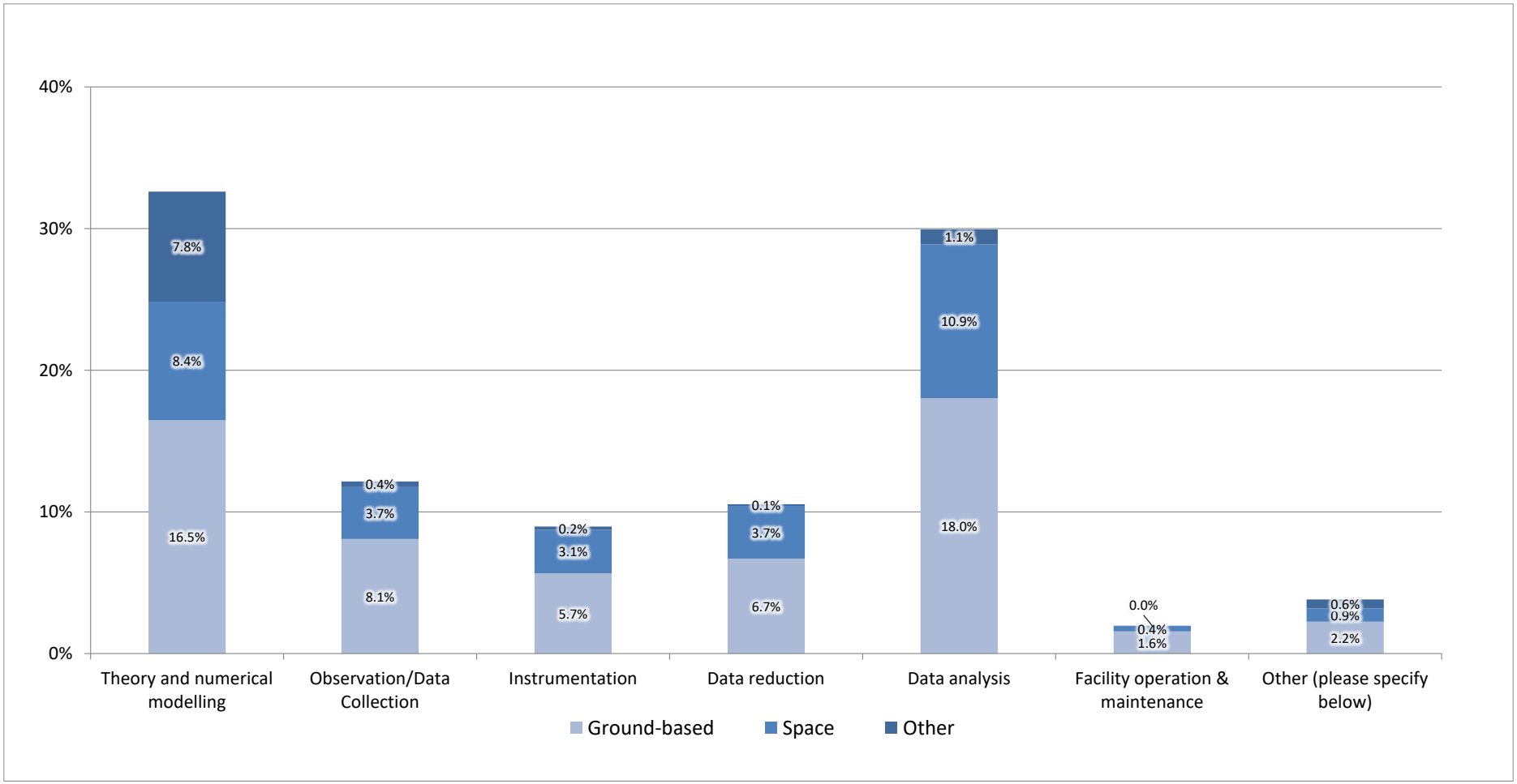

Figure 15: Proportion of effort spent on various general research activities by respondents with research interests in astronomy, 2016

Table 32 shows the pattern of use of facilities at various wavelengths by those respondents with research interests in astronomy as FTEs and Figure 16 presents the data as proportions of total effort. Figure 17 presents the equivalent chart from 2016 for comparison.

The data show that there have been some changes in the reported use of facilities by wavelength. Use of facilities at radio and UV wavelengths have increased, while those at mm and sub-mm wavelengths have decreased. However, as in 2010 and 2016, the greatest use is made of facilities at optical wavelengths with about 30% of effort, followed by infra-red and radio both at about 12.5%.

Table 32: The pattern of use of facilities at various wavelengths by respondents with permanent roles with interests in astronomy shown as full-time equivalents, 2023 (N=458)

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	3.6	1.4	3.3	9.5	2.2	2.6	1.7	2.1	13.6	40.1
Observation/Data Collection	2.4	0.8	2.4	5.6	0.7	1.0	0.2	0.2	0.6	13.9
Instrumentation	1.6	0.8	2.6	3.2	0.6	0.6	0.3	1.8	0.6	12.3
Data reduction	2.6	1.3	1.3	4.5	1.3	1.0	0.0	0.2	0.6	12.9
Data analysis	5.9	3.3	6.0	14.8	4.7	3.3	0.8	2.0	2.3	43.1
Facility operation & maintenance	0.4	0.0	0.5	1.1	0.0	0.1	0.0	0.2	0.7	3.0
Other	0.1	0.0	0.2	1.2	0.0	0.5	0.0	1.6	3.2	6.8
Totals	**16.5**	**7.6**	**16.2**	**40.0**	**9.6**	**9.2**	**3.0**	**8.2**	**21.8**	**132.0**

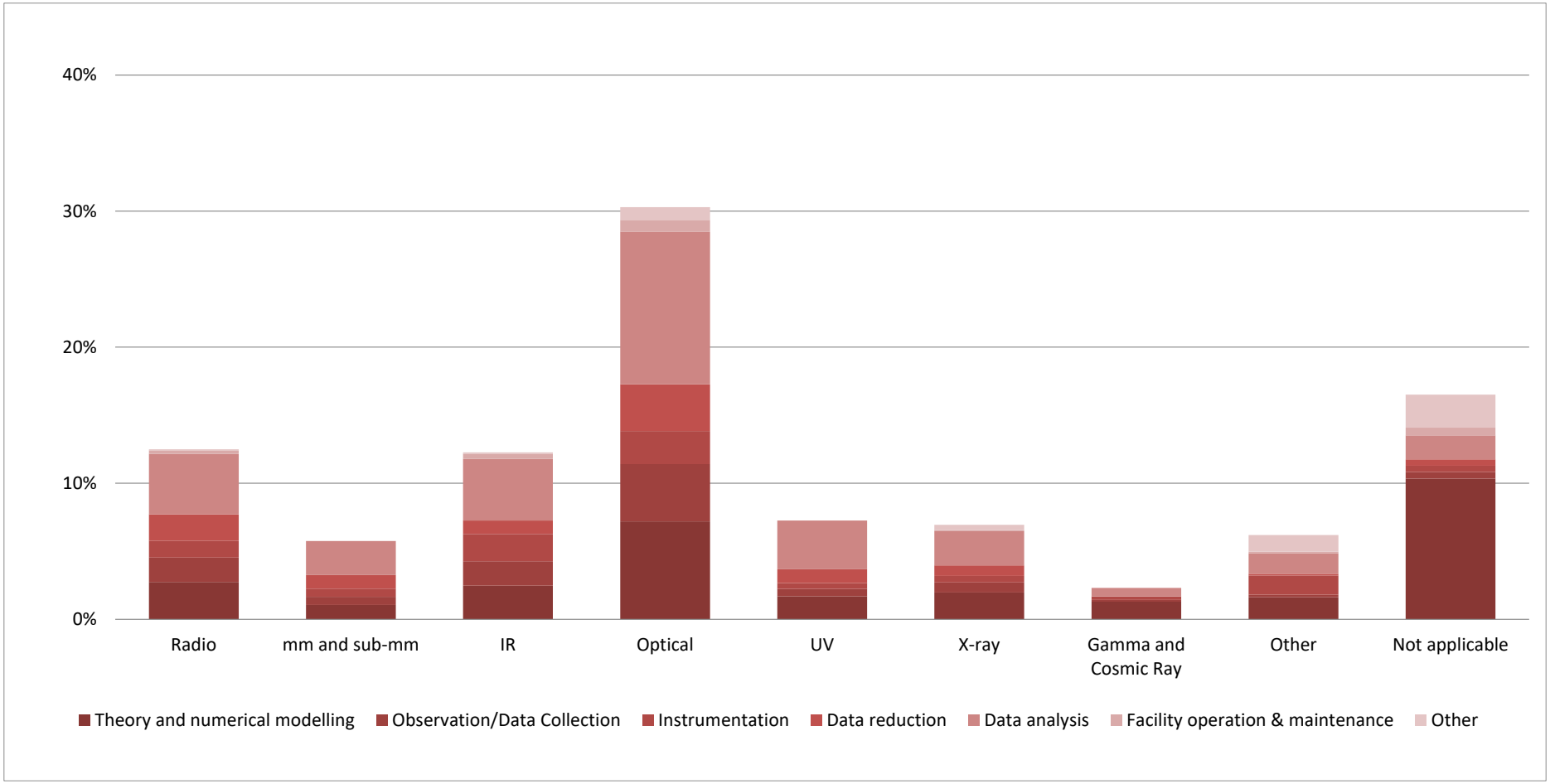

Figure 16: Proportion of effort spent on use of facilities at various wavelengths by permanent staff respondents with research interests in astronomy, 2023

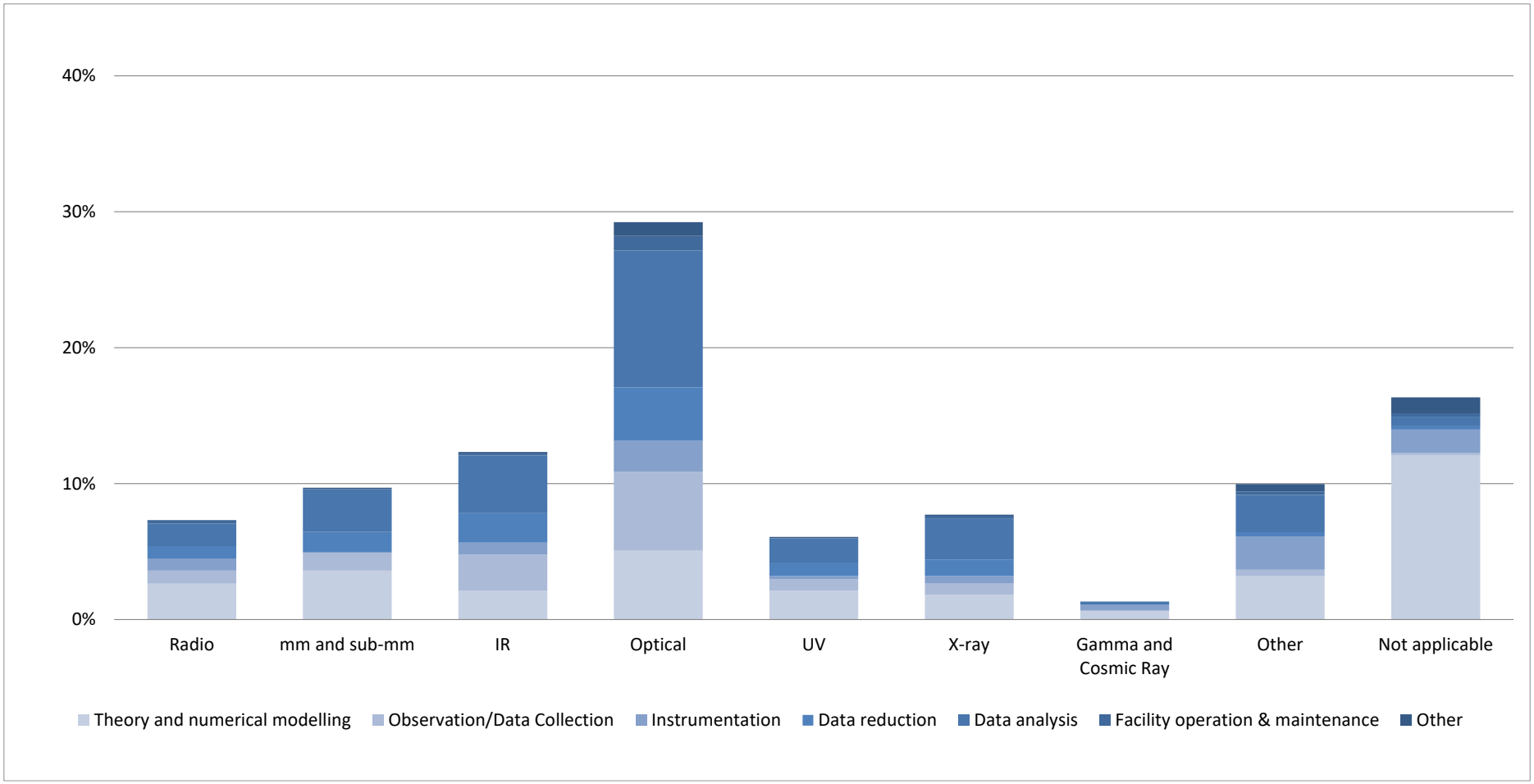

Figure 17: Proportion of effort spent on use of facilities at various wavelengths by permanent staff respondents with research interests in astronomy, 2016

Table 33 indicates the relative effort expended on each research area by all permanently employed respondents with research interests in geophysics and Figure 18 shows the proportion of total effort expended on each general activity for geophysics. Figure 19 show proportion of total effort expended on each general activity for geophysics in 2010 for comparison.

Table 33: The distribution of research effort of respondents with permanent roles with interests in geophysics shown as full-time equivalents, 2023 (N=44)*

General research area	Research effort expended (FTEs)			
	Ground-based	Space	Other	Totals
Theory and numerical modelling	2.3	0.9	0.6	3.8
Observation/Data Collection	1.7	0.1	0.9	2.6
Instrumentation	0.4	0.0	0.0	0.4
Data reduction	0.8	0.2	0.2	1.2
Data analysis	2.9	0.9	0.3	4.1
Facility operation & maintenance	0.2	0.0	0.1	0.3
Other	0.2	0.0	0.0	0.2
Totals	**8.6**	**2.1**	**2.0**	**12.7**

* Table 33 contains information on all respondents who indicated a broad research interest in geophysics. There is some overlap with the respondents included in Table 31 who indicated research interests in both astronomy and geophysics.

In Geophysics 32% of effort is expended on *Data Analysis*, 30% is expended on *Theory and numerical modelling* and 21% is expended on *Observation/Data Collection*. These three areas were also the most popular in 2010 and 2016 but the order was different in 2010. Less effort is expended on *Data reduction* (10%), *Instrumentation* (3%), *Facility operation and maintenance* (3%) and *Other activities* (2%). Effort is biased towards *Ground-based activities* at 68% (2016: 77%), with *Space activities* representing 17% (2016: 14%) of effort and *Other activities* 16% (2016: 10%).

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.

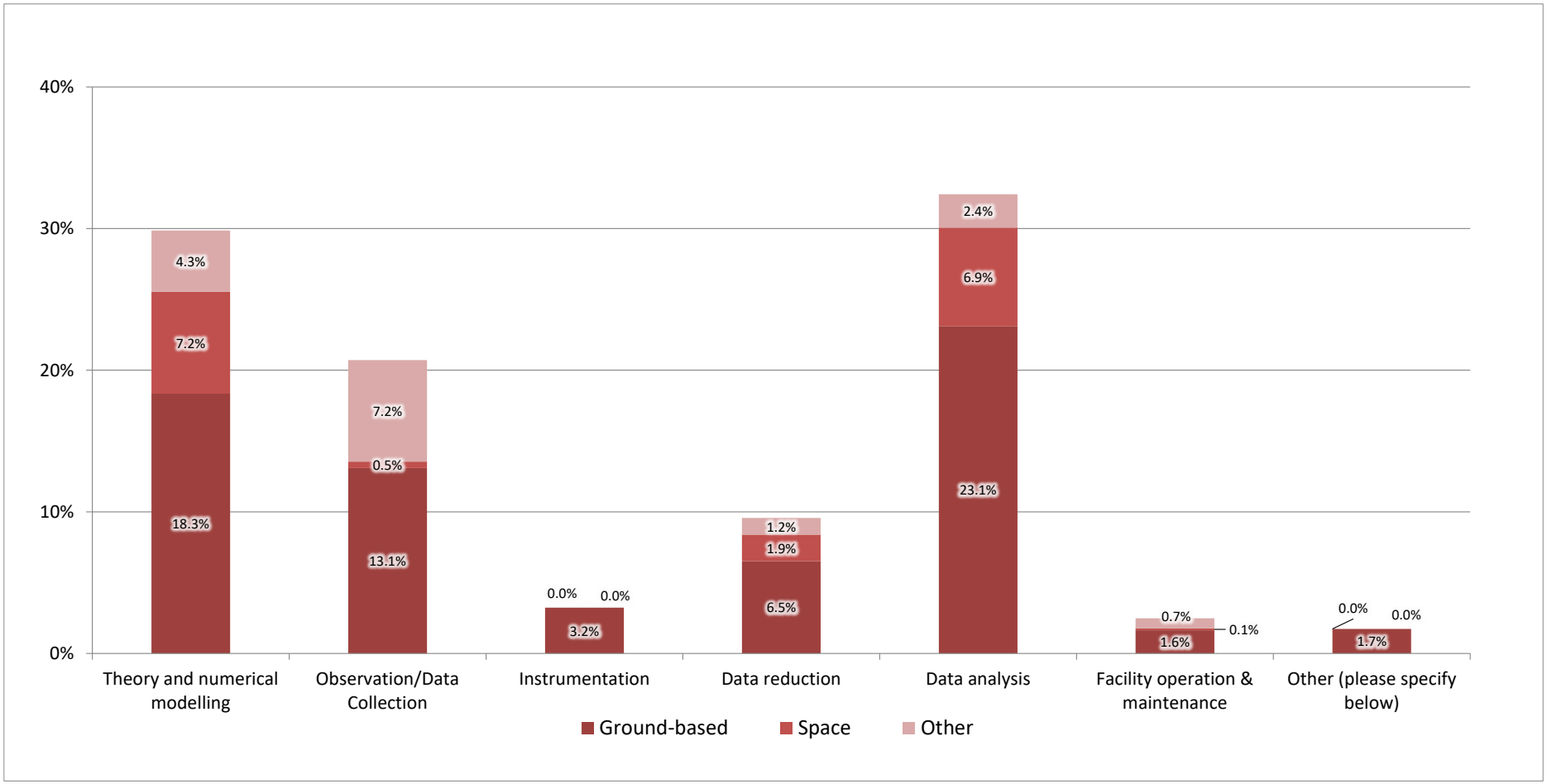

Figure 18: Proportion of effort spent on various general research activities by permanent staff respondents with research interests in geophysics, 2023

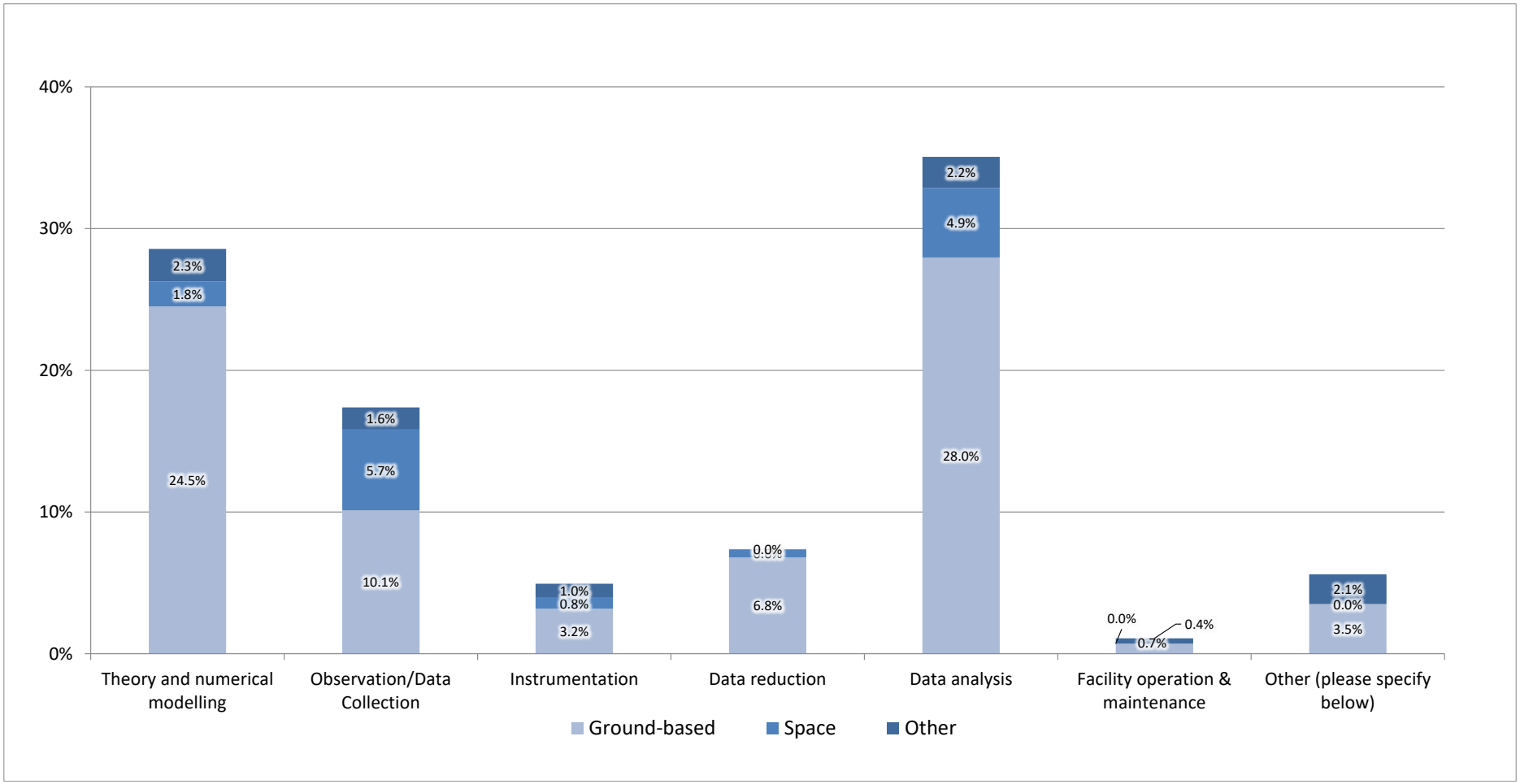

Figure 19: Proportion of effort spent on various general research activities by respondents with research interests in geophysics, 2016

4.2 Fixed-term postdoctoral research associates

175 respondents who completed the questionnaire indicated that they were temporary/fixed-term postdoctoral research associates, comprising 94 men, 74 women, 2 non-binary and 1 respondent who did not indicate their gender. Of these, 1 woman and 2 non-binary respondents indicated that their gender did not match that registered at birth.

4 men, 2 women and 1 non-binary respondent indicated that they worked part-time.

22 staff reported that they considered themselves disabled. This is a notable increase from 2016 when only 5 out of 213 respondents indicated that they considered themselves disabled. However, there is no clear pattern of disclosure rates varying with age suggesting that disclosure rates have increased in all age groups.

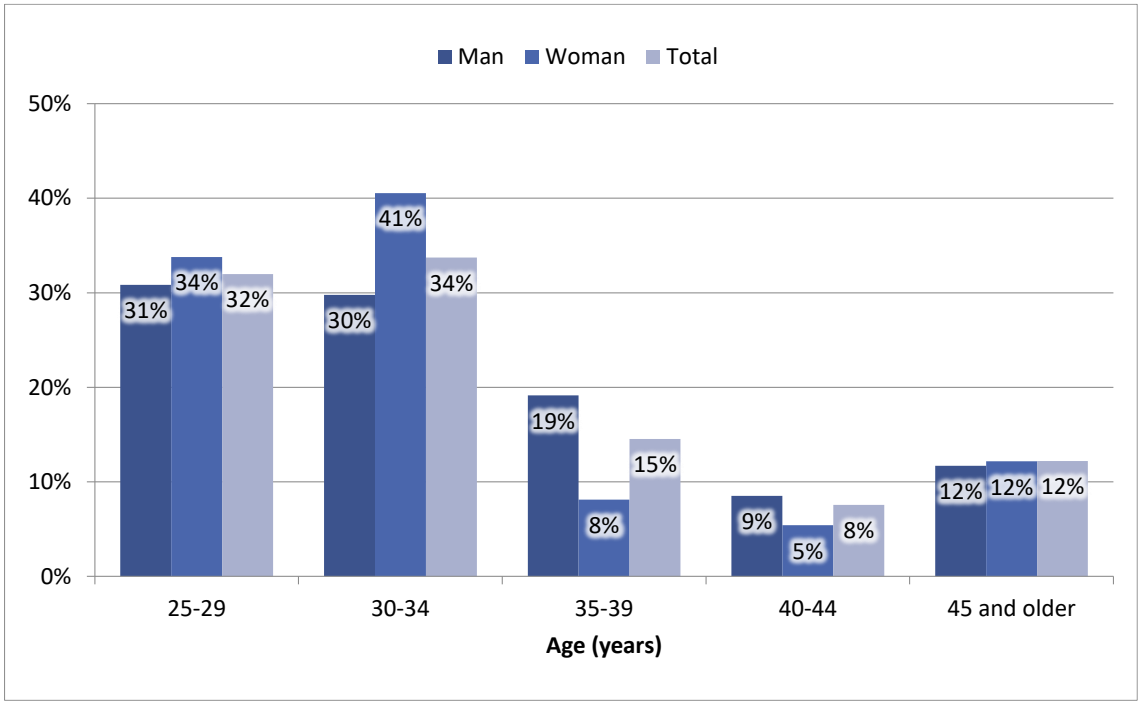

Figure 20: Age profiles of men and women postdoctoral research associates, 2023

As shown in Figure 20, men are on average older than women with a notable fall in women's representation compared to men's in the 35-30 and 40-44 age bands. In contrast, 41% of the women respondents fall into the 30-34 age band compared to only 30% of men. The data suggest that women are less likely than men to continue as fixed term researchers past their mid-thirties.

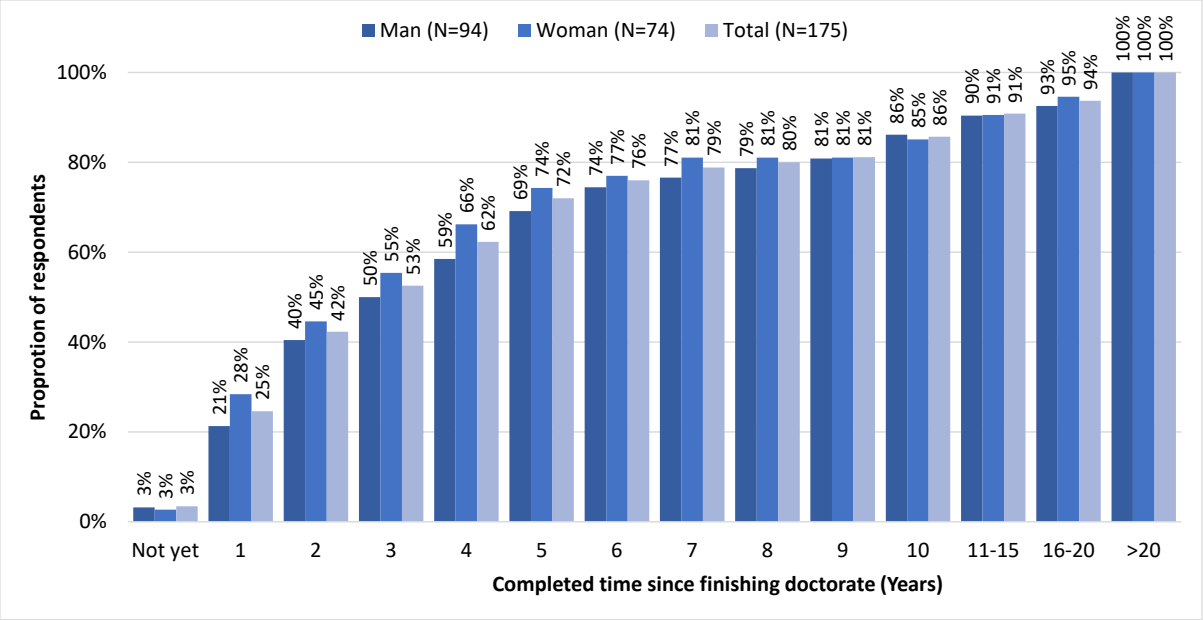

Figure 21: Cumulative plots of the time since obtaining their doctorates for postdoctoral research associates by gender, 2023

Figure 21 shows the cumulative proportion of postdoctoral research as the length of time since they completed their doctorates. The data show that in general woman have completed their doctorates more recently than men. Specifically, 50% of women and 55% of men had completed their doctorate within the 4 years, and 59% of women and 66% of men had completed their doctorates within the last 5 years.

Respondents were asked about their religious beliefs. The results are shown in Table 34. Patterns were similar to those found in 2016, with 71% of those who disclosed their beliefs stating that they had no religion/were agnostic, and 20% reporting that they were Christian. As in 2016, the results are in line with those for permanent staff and as such postdoctoral research associates who responded to the survey were almost twice as likely as the general population to report that they had no religion.

Table 34: Religious beliefs of postdoctoral research associates responding to the individual questionnaire, 2016 and 2023

Religion	2016		2023		Census 2021 England and Wales	Census 2021 Northern Ireland*	Census 2022 Scotland
	Number	Distribution	Number	Distribution			
No religion/Agnostic	143	72.3%	116	71.1%	37.2%	17.4%	51.1%
Christian	46	23.6%	32	19.6%	46.2%	79.7%	38.8%
Hindu	3	1.5%	10	6.1%	1.7%		0.6%
Muslim			2	1.2%	6.5%		2.2%
Buddhist	1	0.5%			0.5%		0.3%
Jewish	2	1.0%	1	0.6%	0.5%		0.1%
Sikh			1	0.6%	0.9%		0.2%
Other			1	0.6%			
Do not wish to say	18		12				
Other Religions/ Not answered/ Does not Apply					6.6%	20.3%	6.2%
Total	**213**	**195**	**175**	**163**	**59,597,583**	**1,903,175**	**5,439,842**

Table 35: Sexual orientation of postdoctoral research associates responding to the individual questionnaire, 2016 and 2023 (by Gender)

Sexual Orientation	2023												2016
	Women				Men				All				
	Survey	Census 2021 England and Wales*	Census 2021 Northern Ireland*	Census 2022 Scotland*	Survey	Census 2021 England and Wales*	Census 2021 Northern Ireland*	Census 2022 Scotland*	Survey	Census 2021 England and Wales*	Census 2021 Northern Ireland*	Census 2022 Scotland*	Distri-bution
Heterosexual or straight	66%	87.0%	85.4%	88.8%	82%	87.8%	86.9%	88.3%	72%	87.4%	86.1%	88.6%	83.1%
Gay or lesbian	0%	1.9%	2.6%	4.5%	6%	3.3%	4.0%	4.4%	3%	2.6%	3.3%	4.4%	4.2%
Bisexual	24%	3.4%	5.4%		4%	1.3%	1.9%		14%	2.4%	3.7%		3.8%
Other	5%	0.8%	1.4%		6%	0.5%	0.8%		8%	0.7%	1.1%		0%
Do not wish to say	4%	6.9%	5.2%	6.7%	1%	7.1%	6.3%	7.3%	3%	7.0%	5.8%	7.0%	8.9%
Total	**74**	**4,137,035**	**354,752**	**123,422**	**94**	**3,913,500**	**339416**	**119,044**	**175**	**8,050,535**	**694,168**	**242,466**	**213**

* Note: All census data are for people aged between 25 and 34.

Table 35 gives the reported sexual orientation of postdoctoral research associate respondents. Overall, 72% 83% of postdoctoral research associates reported themselves as heterosexual or straight, a 9% fall since 2016, 3% as gay or lesbian and 14% as bisexual. The Census 2021 data for people aged 25-34 years old by sex are also shown.

There are differences by gender with 66% of women and 82% of men describing themselves as heterosexual or straight, no women and 6% of men as lesbian or gay, and 24% of women and 4% of men describing themselves as bisexual. Although there are differences in the reported sexual orientation of females and males in the census data, both women and men respondents are less likely than the general population to describe themselves as heterosexual or straight. Women respondents are also much more likely than the general population to describe themselves as bisexual.

The ethnicity and nationality of the postdoctoral research associate respondents is shown in Table 36.

Table 36: Ethnicity and nationality of postdoctoral research associates, 2023

Ethnicity		Distribution of postdoctoral research associates by nationality					
		British	European Union	USA	Other	Do not wish to say	Total
White: British		81%	0%	0%	0%	0%	43%
White: Other		6%	100%	100%	34%	22%	34%
Asian: Indian		5%	0%	0%	25%	0%	7%
Asian: Bangladeshi		0%	0%	0%	0%	0%	0%
Asian: Pakistani		0%	0%	0%	0%	0%	0%
Asian: Chinese		0%	0%	0%	16%	11%	3%
Asian: Other		3%	0%	0%	16%	0%	5%
Black: African		0%	0%	0%	0%	0%	0%
Black: Caribbean		0%	0%	0%	0%	0%	0%
Mixed: White and Asian		3%	0%	0%	3%	0%	2%
Mixed: White and Black		0%	0%	0%	0%	0%	0%
Mixed: Other Mixed Background		0%	0%	0%	6%	0%	1%
Any other ethnic group		0%	0%	0%	6%	0%	1%
Do not wish to say		1%	0%	0%	0%	67%	4%
Totals	**Number**	**93**	**37**	**4**	**32**	**9**	**175**
	Distribution	**53%**	**21%**	**2%**	**18%**	**5%**	**100%**

Overall, 53% of respondents are British compared to 48% in 2016, and, of these, 89% of those who indicated their ethnicity are White which is lower than the 97% in 2016. 21% of the sample have European Union nationalities, with all indicating that their ethnicity is White. 18% of the sample indicated that their nationality is from outside the European Union or the United States.

Between 2010 and 2016, the proportion of respondents who are British has fell from 61% to 48% and has now risen to 53% in 2023. The proportion of respondents with nationalities from other European Union countries was 28% in 2010 and this proportion rose to 33% in 2016. In 2023 the proportion of respondents from the European Union is 21%. The reason for the fall in the proportion of postdoctoral research associate respondents from the European Union is unknown but possible causes are Brexit and/or the Covid-19 pandemic.

Table 37 shows the nationality of respondents together with the country in which they carried out their PhD research. 96% of British respondents, and 29% of other respondents carried out their PhD research in the UK. In 2016, 17% of other respondents carried out their PhD research in the UK suggesting that since 2016, a smaller proportion of PhD graduates are moving to the UK to undertake postdoctoral research.

Table 37: Nationality and country in which postdoctoral research associates studied for their PhD, 2023

Country in which postdoctoral research associates studied for their PhD	Count of postdoctoral research associates by nationality					
	British	Other European Union	USA	Other	Do not wish to say	Total
UK	89	13	0	8	5	115
Other European Union	2	24	0	7	1	34
USA	0	0	4	2	0	6
Elsewhere	1	0	0	15	1	17
Totals	**93**	**37**	**4**	**32**	**9**	**175**

Table 38: Number and age of children of postdoctoral research associates responding to the individual questionnaire, 2023

Number and age of children				Number of postdoctoral research associate respondents
Number of pre-school age children (under 5 years old)	Number of school age children (5 to 18 years old)	Number of grown up children (above 18 years old)	Total number of children	
0	0	0	0	148
		1	1	1
		2	2	1
	1	0	1	9
	2	0	2	3
		1	3	2
		3	5	1
	3	0	3	1
1	0	0	1	6
	1	0	2	1
2	2	0	4	1
Do not wish to say				1
Total				**175**

Table 39: Number of children of postdoctoral research associates responding to the individual questionnaire, 2023

Number of Children	Gender of postdoctoral research associates				
	Women	Men	Other	Do not wish to say	Total
0	67	76	2	3	148
1	1	9	0	0	16
2	0	4	0	1	5
3	2	1	0	0	3
4	0	1	0	0	1
5	0	0	0	0	1
Do not wish to say	0	0	0	1	1
Total	**70**	**91**	**2**	**5**	**175**

Table 38 presents data on the number of children postdoctoral research associates have, broken down by whether the children are pre-school age, school age (5 to 18 years old) or grown up (above 18 years old). Table 39 presents the same data but shows the total number of children. 85% of postdoctoral research associates do not have children.

Table 40: Funding sources for postdoctoral research associates responding to the individual questionnaire by nationality, 2023

Funding Source	Nationality of postdoctoral research associates			
	British	Other European Union	Other	Total
STFC	36	7	11	54
European Commission/ERC	11	3	6	20
The University/Department	8	5	3	16
NERC	11	1	1	13
UK Space Agency	4	5	1	10
Royal Society	0	4	4	8
UKRI	2	3	2	7
Joint Funding Sources	4	1	2	7
EPSRC	1	1	2	4
Other Sources	5	3	2	10
Total Respondents	**82**	**33**	**34**	**149**

The sources of funding for postdoctoral research associates broken down by nationality are shown in Table 40. 44% of British postdoctoral research associates are funded by the STFC, and 27% of those of other nationalities. 13% of British postdoctoral research associates are funded by NERC, and 3% of other nationalities. 13% of British and 13% of other nationality postdoctoral research associates are funded by the European Commission/European Research Council. In 2016, 34% of other nationality postdoctoral research associates were funded by the European Commission/European Research Council; presumably the fall is an effect of Brexit.

The proportion of time that postdoctoral research associates spend on various activities is shown in Table 41. On average 81% of time is spent on research activities, which as expected in a research-centred role, is more than double the proportion of time spent by permanent academic staff. 69 respondents indicated that they spend at least 90% of their time on research-related activities. The pattern of effort has changed very little since 2016.

Table 41: How postdoctoral research associates divide their time between different activities, 2016 and 2023

Activity	Proportion of time spent on specific activities	
	2016 (N=196)	2023 (N=163)
Research	82%	81%
Undergraduate teaching	5%	3%
Postgraduate teaching	2%	2%
Administration associated with job	4%	5%
Public engagement/ outreach	3%	5%
Other	5%	3%

Table 42 shows the broad research areas in which postdoctoral research associates work. 124 respondents indicated activity in a single research area, 43 indicated 2 areas, 5 indicated 3 areas, and 1 indicated 4 areas.

Table 42: The main research areas of postdoctoral research associates, 2023 (N=173)

Broad research area of postdoctoral research associates*	Count of postdoctoral research associates by gender			
	Woman (N=74)	Man (N=92)	Non-binary (N=2)	Total (N=173)
Astronomy: Astronomy and/or Astrophysics	51 (69%)	63 (68%)	2 (100%)	119 (69%)
Astronomy: Particle Astrophysics	0 (0%)	3 (3%)	0 (0%)	3 (2%)
Solar System: Planetary Science	10 (14%)	12 (13%)	1 (50%)	23 (13%)
Solar System: Earth Observation	2 (3%)	4 (4%)	0 (0%)	6 (3%)
Solar System: Atmospheric Science	4 (5%)	7 (8%)	0 (0%)	11 (6%)
Solar System: The Sun	2 (3%)	8 (9%)	0 (0%)	12 (7%)
Solar System: Solar-Terrestrial Physics	9 (12%)	8 (9%)	0 (0%)	18 (10%)
Solar System: Cross Discipline Topics	2 (3%)	0 (0%)	0 (0%)	2 (1%)
Geophysics: Solid Earth Geophysics	4 (5%)	7 (8%)	0 (0%)	12 (7%)

* Respondents were able to indicate more than one research area

69% (2016: 78%) of respondents indicated that they have interests in some aspect of *Astronomy*, 32% (2016: 19%) indicated an interest in some aspects of *Solar System Science*, and 7% (2016: 8%) indicated an interest in *Geophysics*. The changes observed are similar to those for permanent staff with a fall in the proportion indicating interests in *Astronomy* and an increase in the proportion showing interests in *Solar System Science*.

Table 43: The distribution of research effort of respondents who are postdoctoral research associates with interests in astronomy shown as full-time equivalents, 2023 (N=153)*

General research area	Research effort expended (FTEs)			
	Ground-based	Space	Other	Totals
Theory and numerical modelling	15.3	9.9	11.0	36.3
Observation/Data Collection	5.9	4.4	0.6	10.9
Instrumentation	4.1	2.0	0.1	6.3
Data reduction	5.9	4.9	0.3	11.1
Data analysis	21.4	20.4	5.3	47.1
Facility operation & maintenance	1.2	0.6	0.0	1.9
Other	1.3	0.5	1.1	2.9
Totals	**55.1**	**42.8**	**18.6**	**116.4**

* Table 44 contains information on all respondents who indicated a broad research interest in an astronomy-related research area.

Table 44: The distribution of research effort of respondents who are postdoctoral research associates with interests in astronomy shown as full-time equivalents, 2016 (N=191)*

General research area	Research effort expended (FTEs)			
	Ground-based	Space	Other	Totals
Theory and numerical modelling	22.1	11.4	12.7	46.1
Observation/Data Collection	10.3	2.2	0.2	12.7
Instrumentation	7.4	2.1	0.8	10.3
Data reduction	14.3	5.3	0.1	19.7
Data analysis	32.3	19.9	3.0	55.2
Facility operation & maintenance	1.1	0.1	0.1	1.4
Other	2.4	0.8	2.0	5.2
Totals	**90.0**	**41.9**	**18.8**	**150.7**

* Table 44 contains information on all respondents who indicated a broad research interest in an astronomy-related research area.

Table 44 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 22 shows the proportion of total effort expended on each general activity. The equivalent data from 2016 are presented in Figure 23.

As in 2010 and 2016, and as would be expected, the pattern of usage shown in Figure 22 is similar to that for permanent staff in astronomy. 31% of effort is expended on *Theory and numerical modelling* and 41% on *Data analysis*. For permanent staff the figures were 31% and 34% respectively. Smaller proportions of effort are expended on *Observation/Data Collection* (9%), *Data reduction* (10%), and *Instrumentation* (5%). Activities are split 47%,

37% and 16% between *Ground-based*, *Space* and *Other* areas respectively, compared to 54%, 38% and 8% respectively for permanent staff. Since 2016, effort on *Ground-based* activity has fallen from 60% and *Space* activity has increased from 28%.

As in 2016, data are not presented for postdoctoral research associates with research interests in geophysics as there were very few survey responses from this group (12).

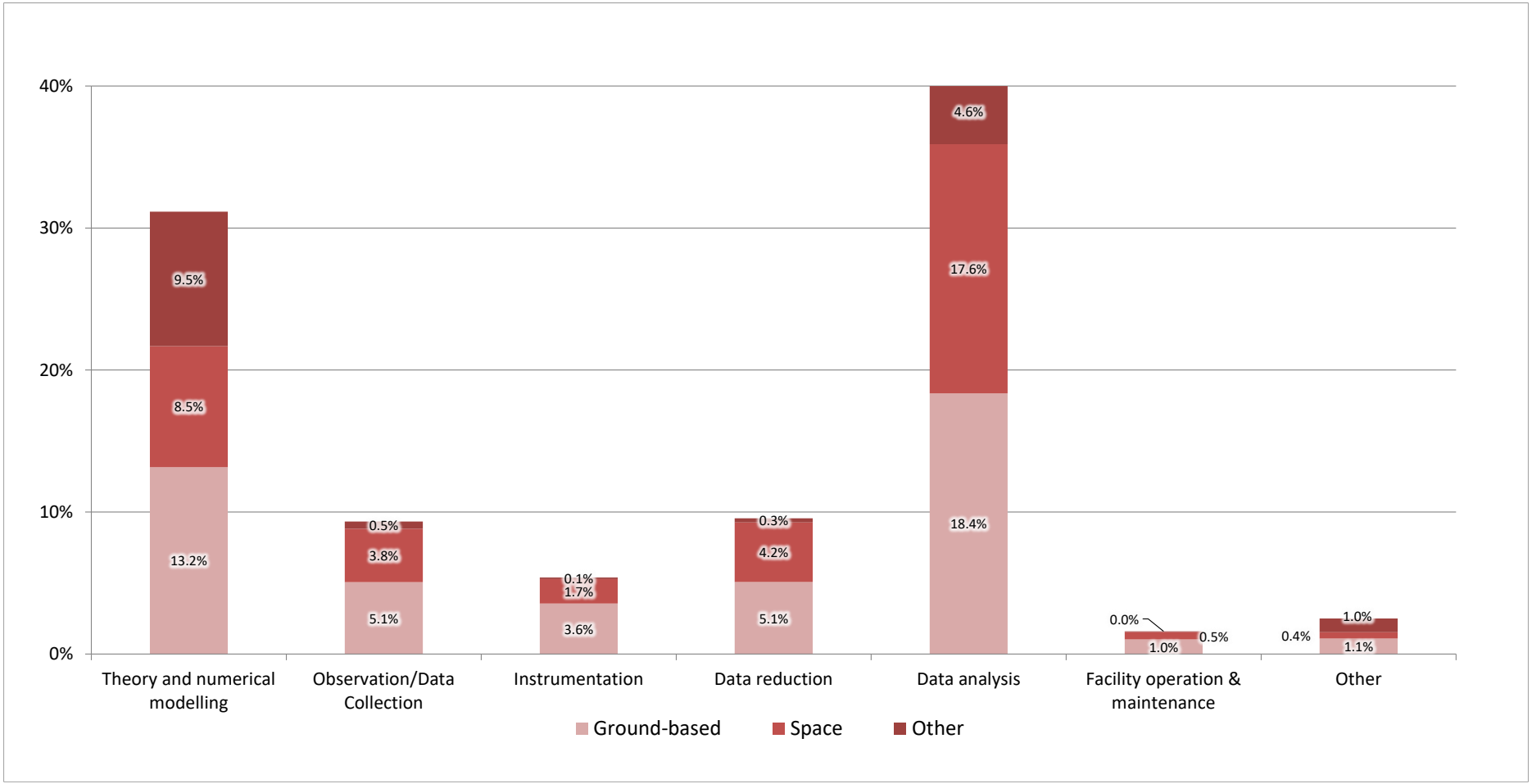

Figure 22: Proportion of effort spent on various general research activities by postdoctoral research associates with research interests in astronomy, 2023

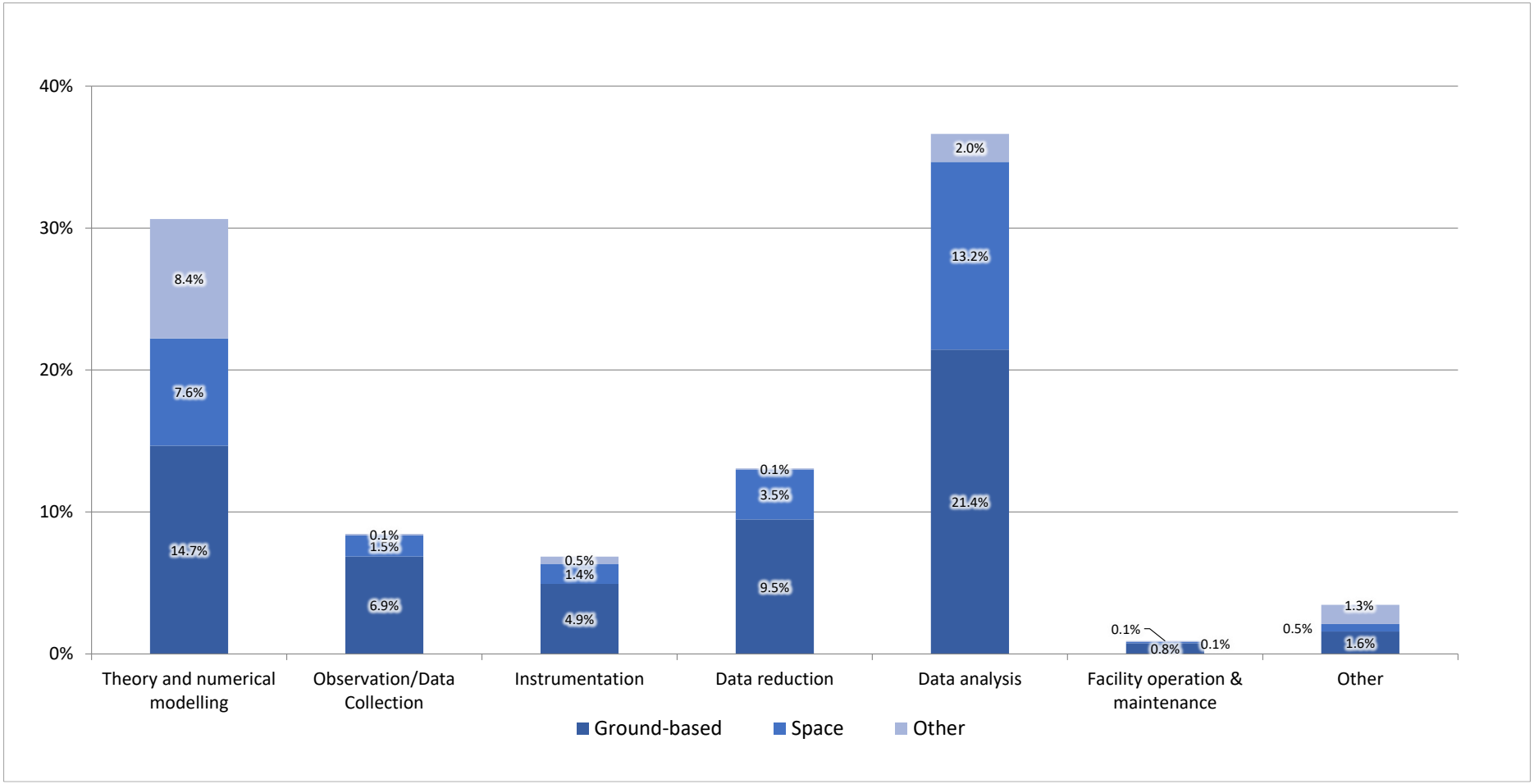

Figure 23: Proportion of effort spent on various general research activities by postdoctoral research associates with research interests in astronomy, 2016

Table 45: The pattern of use of facilities at various wavelengths by postdoctoral research associates with research interests in astronomy shown as full-time equivalents, 2023 (N=191)*

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	0.62	0.76	2.91	7.52	1.84	2.10	0.16	1.48	10.64	28.03
Observation/Data Collection	0.86	0.56	1.73	3.60	1.07	0.69	0.02	0.06	0.36	8.95
Instrumentation	0.15	0.48	1.63	2.08	0.12	1.38	0.04	0.72	0.47	7.09
Data reduction	1.92	0.55	1.18	4.67	0.98	0.76	0.00	0.26	0.59	10.92
Data analysis	3.18	1.76	7.89	13.41	3.82	2.21	0.22	1.09	2.95	36.52
Facility operation & maintenance	0.04	0.04	0.09	1.34	0.18	0.08	0.00	0.40	1.23	3.41
Other (please specify below)	0.07	0.00	0.19	0.60	0.00	0.00	0.00	0.00	0.00	0.86
Totals	**6.84**	**4.15**	**15.63**	**33.23**	**8.01**	**7.23**	**0.44**	**4.00**	**16.24**	**95.77**

Table 45 shows the pattern of use of facilities at various wavelengths by postdoctoral research associates with research interests in astronomy as a Full-Time Equivalent number of staff and Figure 24 presents the same data as proportions of total research effort. The 2016 data are presented in Figure 25 for comparison.

As with the permanent staff, the data show that the greatest use is made of facilities at optical wavelengths which has double the effort as that expended on IR wavelengths. Compared to 2016, use of Radio and mm and sub-mm facilities has fallen, while the use of those at Optical and UV wavelengths has risen. The popularity of work at IR wavelengths had fallen between 2010 and 2016, but IR work has risen in popularity to be the second most popular area once again.

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.

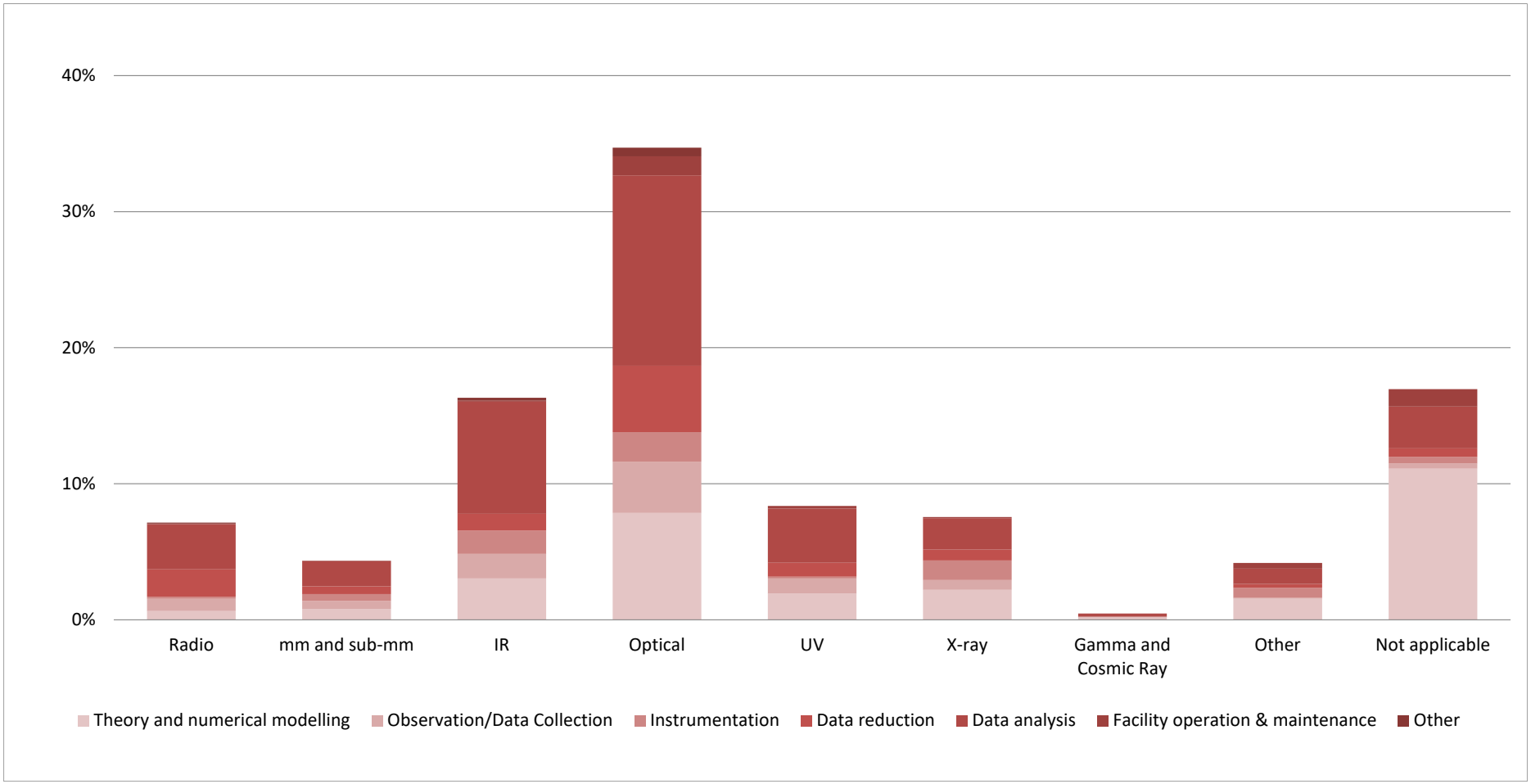

Figure 24: Proportion of effort spent on use of facilities at various wavelengths by permanent staff respondents with research interests in astronomy, 2023

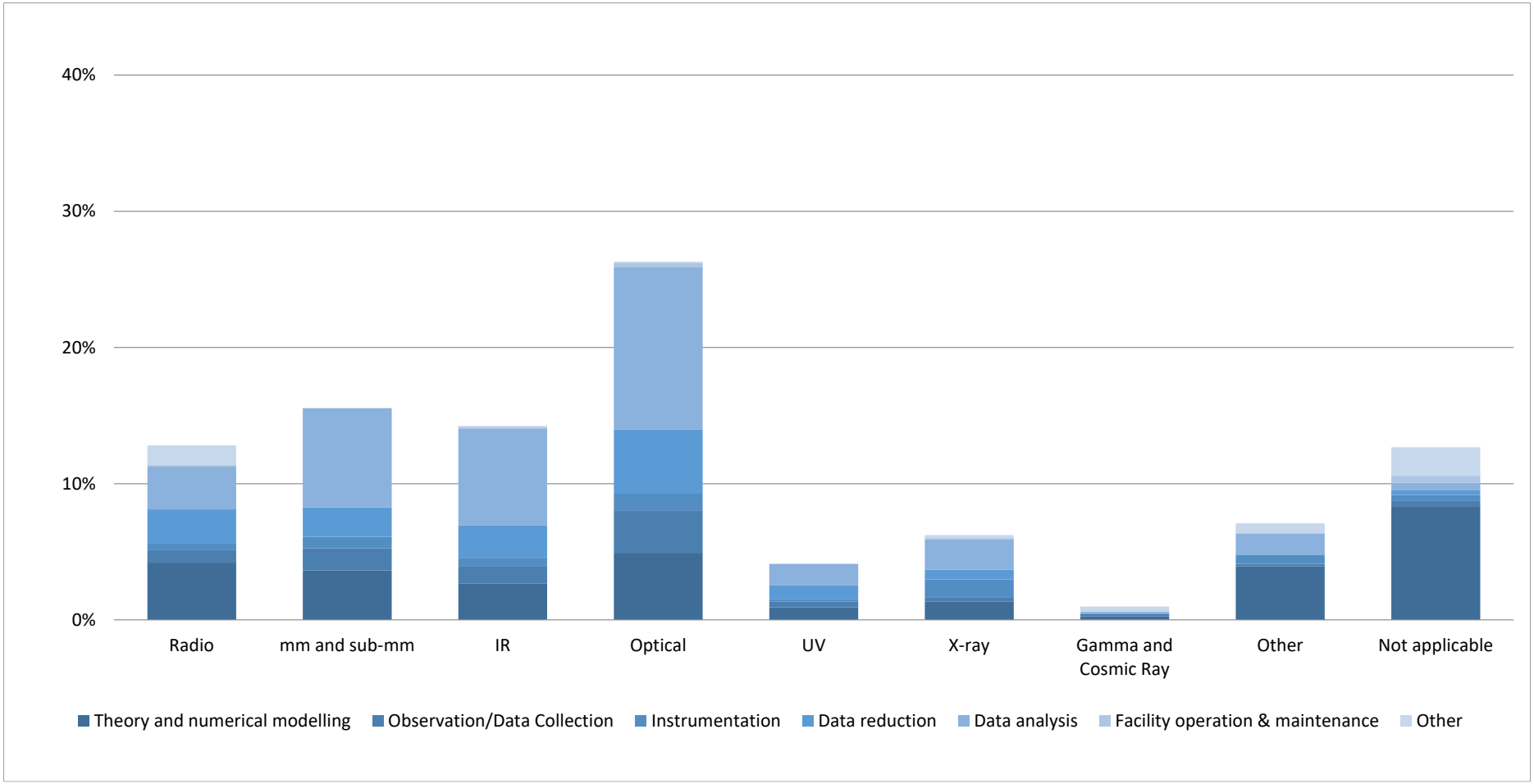

Figure 25: Proportion of effort spent on use of facilities at various wavelengths by permanent staff respondents with research interests in astronomy, 2016

4.3 Postgraduate research students

317 research students began the questionnaire of which 26 did not complete the questionnaire. None of the respondents reported that they did not have work in areas related to Astronomy or Geophysics.

279 students are studying for doctorates and 8 for master's degrees. 20 students are studying part-time.

40 research students reported that they considered themselves to be disabled, as with the postdoctoral research associates, a notably higher proportion than in 2016 when just 6 out of 279 reported that they considered themselves disabled.

Of the 264 respondents working in areas related to astronomy who specified their gender, 41% are women, 50% are men, 7% are non-binary and 1% did not indicate their sex. These figures differ from 2016 and 2010 when 65% were male and about 33% were female (the 2016 and 2010 surveys asked about sex not gender). Of the 20 respondents who indicated interests in geophysics, 10 (50%) were women and 9 (45%) were men.

Table 46: Gender and broad research interests of postgraduate research students responding to the individual questionnaire, 2023

Gender	Broad Research Interests					
	Astronomy		Astronomy and Geophysics		Geophysics	
	Count	Distribu-tion	Count	Distribu-tion	Count	Distribu-tion
Women	109	41%	2	29%	10	50%
Men	133	50%	5	71%	9	45%
Non-binary	19	7%	0	0%	1	5%
Do not wish to say	3	1%	0	0%	0	0%
Total	**264**		**7**		**20**	

18 postgraduate research students indicated that they have children, and all of those indicated that the children were over the age of 18.

Table 47 gives the self-reported sexual orientation of postgraduate research student respondents and Table 51 presents the data from 2016 for comparison. Census Data from are also presented in Table 48, Table 49 and Table 50.

61% of postgraduate research students reported themselves as heterosexual or straight, 6% as gay or lesbian and 19% as bisexual. The patterns for women and men are very different with 43% of women and 86% of men reported themselves as heterosexual or straight, 8% of women and 4% of men as lesbian or gay, and 33% of women and 5% of men as bisexual. were different albeit the numbers of women are too small to draw any firm conclusions.

Compared to the 2016 respondents, the proportions of heterosexual or straight women and men have fallen and the proportions of lesbian or gay and bisexual respondents have risen. For women the changes are largest with the proportion of heterosexual or straight respondents falling from 70% to 43% and the proportion of bisexual respondents increasing from 13% to 33%.

While the distribution of men's sexual orientations among respondents is broadly in line with the 2021 Census data for people aged 16 to 24 years, that for women is very different: for example, in the England and Wales census data, 81% of females are heterosexual or straight, 2% are lesbians and 6% are bisexual. Why there are such large differences is unknown.

Table 47: Sexual orientation of postgraduate research students responding to the individual questionnaire by gender, 2023

Sexual Orientation	Postgraduate research students							
	Women		Men		Non-Binary		Total	
	Count	Distri-bution	Count	Distri-bution	Count	Distri-bution	Count	Distri-bution
Heterosexual or straight	52	43%	126	86%	0	0%	178	61%
Gay or lesbian	10	8%	6	4%	0	0%	17	6%
Bisexual	40	33%	8	5%	8	40%	56	19%
Other	14	12%	2	1%	0	0%	18	6%
Do not wish to say	5	4%	5	3%	12	60%	22	8%
Total	**121**		**147**		**20**	**20**	**291**	

Table 48: Census 2021 England and Wales: Sexual orientation by age and sex

Sexual Orientation	Aged 16 to 24 years			Aged 25 to 34 years		
	Female	Male	All	Female	Male	All
Straight or heterosexual	80.9%	86.0%	83.5%	87.0%	87.8%	87.4%
Gay or lesbian	2.1%	2.1%	2.1%	1.9%	3.3%	2.6%
Bisexual	6.2%	1.9%	4.0%	3.4%	1.3%	2.4%
Other	1.1%	0.5%	0.8%	0.8%	0.5%	0.7%
Not answered	9.7%	9.5%	9.6%	6.9%	7.1%	7.0%
Population	**3,116,295**	**3,202,015**	**6,318,310**	**4,137,035**	**3,913,500**	**8,050,535**

Table 49: Census 2021 Northern Ireland: Sexual orientation by age and sex

Sexual Orientation	Aged 16 to 24 years			Aged 25 to 34 years		
	Female	Male	All	Female	Male	All
Straight or heterosexual	85.4%	88.6%	87.1%	88.8%	88.3%	88.6%
Gay, lesbian, bisexual, other sexual orientation	5.9%	3.4%	4.6%	4.5%	4.4%	4.4%
Not answered	8.6%	8.0%	8.3%	6.7%	7.3%	7.0%
Population	**97,698**	**103,669**	**201,367**	**123,422**	**119,044**	**242,466**

Table 50: Census 2022 Scotland: Sexual orientation by age and sex

Sexual Orientation	Aged 16 to 24 years			Aged 25 to 34 years		
	Female	Male	All	Female	Male	All
Straight or heterosexual	76.6%	84.2%	80.4%	85.4%	86.9%	86.1%
Gay or lesbian	3.2%	3.2%	3.2%	2.6%	4.0%	3.3%
Bisexual	9.7%	3.1%	6.4%	5.4%	1.9%	3.7%
Other	2.1%	0.9%	1.5%	1.4%	0.8%	1.1%
Not answered	8.4%	8.6%	8.5%	5.2%	6.3%	5.8%
Population	**290,992**	**291,489**	**582,481**	**354,752**	**339,416**	**694,168**

Table 51: Sexual orientation of postgraduate research students responding to the individual questionnaire by gender, 2016

Sexual Orientation	Postgraduate research students					
	Women		Men		Total	
Heterosexual or straight	66	70%	143	93.5%	210	76%
Gay or lesbian	3	3%	16	1.5%	20	7%
Bisexual	12	13%	9	0.6%	23	8%
Do not wish to say	13	14%	9	4.4%	23	8%
Other	0	0%	0	0%	0	0%
Total	**81**		**168**		**253**	

As shown in Table 52, overall 68% of postgraduate research students are British, 16% are from the European Union, and 3% are from the USA. There is no significant difference between the distributions of nationalities of men and women, albeit women are more likely to be from the European Union and men are more likely to be of other nationalities. The

distribution is very like that in 2016 and 2010, suggesting that Brexit and the Covid-19 pandemic have had little effect on the nationalities of postgraduate students.

Table 52: The nationality and gender of postgraduate research students in astronomy and geophysics, 2023, with overall data for 2016 and 2010

Nationality	Women	Men	Non-binary	Total	2016	2010
British	68.6%	67.3%	60%	67.4%	68.5%	68.2%
European Union	18.2%	12.9%	20%	15.5%	16.1%	15.9%
USA	2.5%	2.0%	15%	3.4%	1.4%	2.3%
Other	9.1%	17.0%	5%	12.7%	12.2%	13.6%
Do not wish to say	1.7%	0.7%	0%	1.0%	1.8%	
Total	**121**	**147**	**20**	**291**	**279**	**249**

The ethnicity and nationality of postgraduate research student respondents is shown in Table 53 and for comparison the 2016 data are shown in Table 54.

Table 53: Ethnicity and nationality of postgraduate research students, 2023

Ethnicity		Distribution of postgraduate research students by nationality					
		British	European Union	USA	Other	Do not wish to say	Total
White (British)		87%	2%	0%	13%	0%	62%
White other		4%	84%	75%	13%	0%	20%
Asian: Indian		2%	2%	13%	32%	0%	6%
Asian: Bangladeshi		0%	0%	0%	0%	0%	0%
Asian: Pakistani		1%	0%	0%	3%	0%	1%
Asian: Chinese		1%	0%	0%	16%	0%	2%
Asian: Other		0%	0%	0%	6%	0%	1%
Black: African		0%	0%	0%	6%	33%	1%
Black: Caribbean		1%	0%	0%	0%	0%	1%
Black: Other		0%	0%	0%	0%	0%	0%
Mixed: White and Asian		1%	0%	0%	0%	0%	1%
Mixed: White and Black		1%	0%	0%	0%	0%	0%
Mixed: Other Mixed Background		0%	7%	13%	0%	0%	1%
Any other ethnic group		1%	5%	0%	6%	0%	2%
Do not wish to say		2%	0%	0%	3%	67%	2%
Totals	**Number**	**186**	**43**	**8**	**31**	**3**	**271**
	Distribution	**69%**	**16%**	**3%**	**11%**	**1%**	**100%**

Table 54: Ethnicity and nationality of postgraduate research students, 2016

Ethnicity		Distribution of postgraduate research students by nationality					
		British	European Union	USA	Other	Do not wish to say	Total
White (British)		84%	0%	25%	7%	0%	60%
White other		2%	92%	75%	28%	20%	20%
Asian: Indian		4%	0%	0%	14%	20%	5%
Asian: Bangladeshi		1%	0%	0%	0%	0%	1%
Asian: Pakistani		0%	0%	0%	3%	0%	0%
Asian: Chinese		1%	3%	0%	10%	0%	2%
Asian: Other		1%	0%	0%	10%	0%	2%
Black: African		0%	0%	0%	7%	0%	1%
Black: Caribbean		0%	0%	0%	0%	0%	0%
Black: Other		1%	0%	0%	0%	0%	0%
Mixed: White and Asian		2%	0%	0%	3%	0%	2%
Mixed: White and Black		2%	0%	0%	0%	0%	1%
Mixed: Other Mixed Background		2%	3%	0%	10%	0%	3%
Any other ethnic group		0%	0%	0%	7%	0%	1%
Do not wish to say		1%	3%	0%	0%	60%	2%
Totals	**Number**	**171**	**37**	**4**	**29**	**5**	**246**
	Distribution	**70%**	**15%**	**2%**	**12%**	**2%**	**100%**

Overall, 82% of the respondents are White and 10% are Asian, 2% are Black and 2% are mixed race.

92% of the British who indicated their ethnicity are White, which is 5% higher than in 2016. 4% of British respondents are Asian, 1% black and 2% mixed race. The England and Wales and Northern Irish census data for 2021 and the Scottish Census data for 2022 combined show that 79% of 20 to 29 year olds (82% of British postgraduate student survey respondents were aged between 20 and 29 years old) were White, 11% Asian, 4% Black, 4% mixed race, and 2% were from other ethnic groups. Among British postgraduate research students, ethnic minority groups are underrepresented.

Respondents were asked about their religious beliefs. The results are shown in Table 55. 78% of those who disclosed their beliefs stated that they had no religion, a slight increase since 2016, and 14% reported that they were Christian, a fall since 2016. The proportion reporting that they have no religion is similar to that among permanent staff and postdoctoral research associates, but the proportion reporting that they are Christians is

smaller. The Census 2021 data for England and Wales and Northern Ireland, and the 2022 data for Scotland, shows that 48.6% of people aged between 16 and 24 years reported that they had no religion and 32.2% reported that they were Christians.

Table 55: Religious beliefs of postgraduate research students responding to the individual questionnaire, 2023 and 2016

Religion	2016		2023	
	Number	Distribution	Number	Distribution
No religion	195	74.7%	217	77.8%
Christian	46	17.6%	39	14.0%
Hindu	9	3.4%	9	3.2%
Jewish	2	0.8%	5	1.8%
Muslim	4	1.5%	4	1.4%
Buddhist	1	0.4%	1	0.4%
Sikh			1	0.4%
Other religion	4	1.5%	3	1.1%
Do not wish to say	15		12	
Total	**276**		**291**	

Table 56 shows the sources of funding for postgraduate students in astronomy and solar system science. 225 respondents indicated a single source of funding, 41 indicated 2 sources of funding and 1 respondent indicated 3 sources.

As in 2016, most British students (57%) in astronomy and solar system science receive funding from the STFC, 10% from the NERC, and 23% from their university. The proportion receiving funding from their university is the same as in 2016 but significantly higher than in 2010 when the figure was 11%. 12% of British students reported that they are self-funded either fully or in combination with another source of funding.

43% of non-British students are supported by their host university and/or department, 38% by research councils, and 11% are self-funded. 10% of all students indicated that have "other" sources of funding which comprise a variety of sources including funding from the research students' home governments.

44% of British solid Earth geophysics students receive their finding from NERC and 31% from the EPSRC.

Table 56: Sources of funding and nationality for postgraduate research students in astronomy and solar system science, 2023

Funding source*	Nationality of postgraduate research students			
	British	European Union	Other	Total
STFC	104	19	4	127
The University/Department	43	14	22	79
Self-Funded	22	3	6	31
NERC	18	2	1	21
European Commission/ERC	7	0	2	9
EPSRC	5	2	1	8
Royal Astronomical Society	2	2	1	5
UK Space Agency	1	0	1	2
Industry	1	1	0	2
Other	12	0	14	26
Total Respondents	183	42	42	267

* Respondents were able to indicate multiple funding sources

Table 57 shows the broad research areas which post graduate research students work in. 222 respondents indicated a single research area, 40 indicated 2 areas, 3 indicated 3 areas, and 3 respondents indicated 4 areas.

Table 57: The main research areas of postgraduate research students, 2023

Broad Research Area*	Woman (N=108)	Man (N=138)	Non-binary (N=19)	Total (N=268)
Astronomy: Astronomy and/or Astrophysics	67 (62%)	104 (75%)	15 (79%)	188 (70%)
Astronomy: Particle Astrophysics	0 (0%)	4 (3%)	1 (5%)	5 (2%)
Solar System: Planetary Science	25 (23%)	20 (14%)	1 (5%)	46 (17%)
Solar System: Earth Observation	1 (1%)	4 (3%)	1 (5%)	7 (3%)
Solar System: Atmospheric Science	2 (2%)	10 (7%)	0 (0%)	13 (5%)
Solar System: The Sun	9 (8%)	8 (6%)	1 (5%)	18 (7%)
Solar System: Solar-Terrestrial Physics	12 (11%)	7 (5%)	1 (5%)	20 (7%)
Solar System: Cross Discipline Topics	1 (1%)	1 (1%)	0 (0%)	2 (1%)
Geophysics: Solid Earth Geophysics	2 (2%)	4 (3%)	0 (0%)	6 (2%)

* Respondents were able to indicate more than one research area

71% of respondents indicated that they have interests in *astronomy and/or astrophysics*, 33% indicated an interest in some aspects of *solar system science*, and 2% indicated an interest in *geophysics*.

Postgraduate research students were not asked the details of how they divided their time. It was assumed that most 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

46 technical staff began the questionnaire and 37 provided enough data to allow analysis. 12 (32%) of the sample were women, 24 (65%) were male and 1 was non-binary. 6 staff worked part-time.

4 out of 12 of the women and 4 out of 24 of the men were in temporary posts. There are too few respondents to assess whether women are more likely to be in temporary roles.

22 (94%) of the technicians were British, and all reported their ethnicity as White.

4 staff reported that they regarded themselves as disabled.

The characteristics of the technical staff respondent are very similar to those of the respondents in 2016.

10 staff reported that they supervised research students.

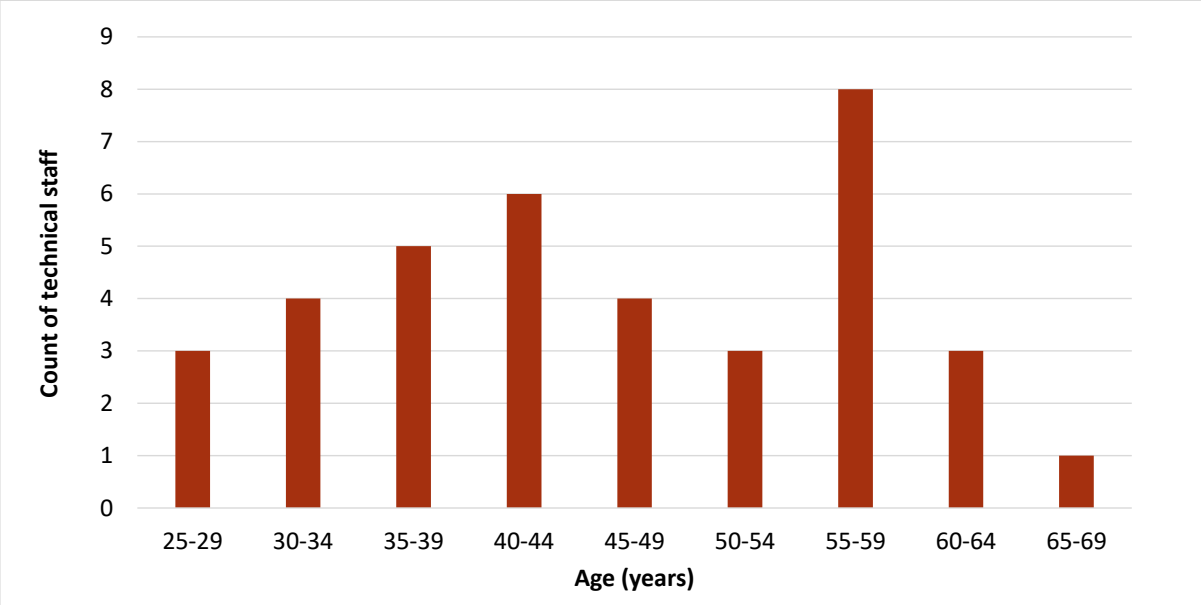

Figure 26: The age profile of technical staff in astronomy and geophysics, 2023

Figure 26 shows the age profile of the technical staff. As in 2016, the sample includes staff across the full working age range but is too small to draw any firm conclusions.

Table 58 presents the information on the sexual orientation of technical staff. 94% report that they are heterosexual or straight.

Table 58: Sexual orientation of technical staff responding to the individual questionnaire, 2023

Sexual Orientation	Count	Distribution
Heterosexual or straight	31	86%
Gay or lesbian	0	0%
Bisexual	1	11%
Other	1	3%
Do not wish to say	1	
Total	**31**	

Respondents were asked about their religious beliefs. Among those who replied, 30 (83%) reported that they had no religion, and 5 (14%) reported that they were Christian.

Table 59: Number of children of technical staff responding to the individual questionnaire, 2023

Number and ages of children				Number of technical staff respondents
Number of pre-school age children (under 5 years old)	Number of school age children (5 to 18 years old)	Number of grown up children (Above 18 years old)	Total number of children	
0	0	0	0	21
		2	2	2
		3	3	2
	1	0	1	1
		1	2	2
		2	3	1
	2	0	2	2
	3	0	3	1
1	0	0	1	2
2	1	1	4	1
Do not wish to say	Do not wish to say	Do not wish to say	-	2
Total				**33**

Table 60: Number of children of technical staff responding to the individual questionnaire by gender, 2023

Number of Children	Women	Men	Non-binary	Total
0	8	14	1	23
1	1	2	0	3
2	2	4	0	6
3	1	3	0	4
4	0	1	0	1
Total	**12**	**24**	**1**	**37**

Table 59 presents data on the number of children technical staff have, broken down by whether the children are pre-school age, school age (5 to 18 years old) or grown up (above 18 years old). Table 60 presents the total number of children broken down by respondents' gender. 62% of technical staff do not have children. This figure appears high but, given the sample size, is too small to draw any firm conclusions but the figure is in line with the 2016 figure (61%).

31 technicians provided information on how they divided their time between various general activities. The results are shown in Table 61 together with the data from 2016 and 2010. As with the age data, the sample size is too small to draw firm conclusions, but although the overall pattern was similar in 2010 and 2016, there are some differences in 2023. In 2023 and in 2010 and 2016 the largest proportion of time is spent on support activities. The amount of time spent on Facility operations and maintenance, instrumentation, and research is notably smaller than previously, and time spent on administration, public engagement/outreach and other activities has increased.

Table 61: How technical staff divide their time between different activities, 2010, 2016 and 2023*

Activity	Proportion of time		
	2010 (N=32)	2016 (N=29)	2023 (N=31)
Support	30%	39%	34%
Facility operations and maintenance	21%	17%	8%
Instrumentation	21%	13%	10%
Research	16%	14%	6%
Teaching	4%	4%	6%
Administration	3%	7%	14%
Public engagement/Outreach	1%	6%	15%
Other	4%	1%	7%

* Note small sample sizes mean that direct comparisons are only indicative.

Table 62 presents data on whether technicians work on ground-based or space-based facilities. The data suggest that that as in 2010 and 2016, there is a tendency towards ground-based work, however, the small sample sizes mean that these comparisons can only be tentative.

Table 62: Whether technicians' work is ground-based or space-based, 2010, 2016 and 2023*

Nature of work	Count		
	2010 (N=31)	2016 (N=29)	2023 (N=31)
Both space- and ground-based	5	2	8
Ground-based	16	19	11
Space-based	7	1	4
Not applicable	3	7	8
Total	**31**	**29**	**31**

* Note small sample sizes mean that direct comparisons are only indicative.

Respondents were asked about their pattern of use of facilities at various wavelengths. The results are shown in Table 63. Of the 29 respondents who completed this part of the questionnaire, 15 indicated that they did not work on any specific wavelength. Of the remaining 14 respondents that provided data, 5 specified a single wavelength region, 6 specified 2 regions, and 3 specified 3 regions.

In line with the data for other staff and postgraduate research students, and with the 2010 and 2016 data, the most frequently used facilities operate in the optical, infrared and radio regions, albeit again the small sample sizes mean that these comparisons can only be tentative.

Table 63: Use of facilities at various wavelengths by technical staff, 2010, 2016 and 2023*

Wavelength region	Count		
	2010 (N=32)	2016 (N=29)	2023 (N=29)
Not applicable	10	15	15
Radio	8	6	9
mm and sub-mm		2	0
IR	7	5	6
Optical	13	8	7
UV	2	1	2
X-ray	1	1	2
Gamma and Cosmic Ray	0	1	0
Other	2	1	0

* Note small sample sizes mean that direct comparisons are only indicative.

4.5 Overall results from individual questionnaires

Although most data generated by the individual questionnaires was designed to be analysed by category of individual respondent's role, 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.

Considering those respondents with research interests in astronomy, Figure 28 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 31% on *Data analysis*, 13% on *Observation/Data Collection*, 10% on *Data reduction*, and 9% on *Instrumentation*, 2% on *Facility operation and maintenance* and 4% on *Other* activities. Activities are split 61%, 30% and 9% between *Ground-based*, *Space* and *Other* areas respectively. The pattern of activity is like that found in 2010 and 2016.

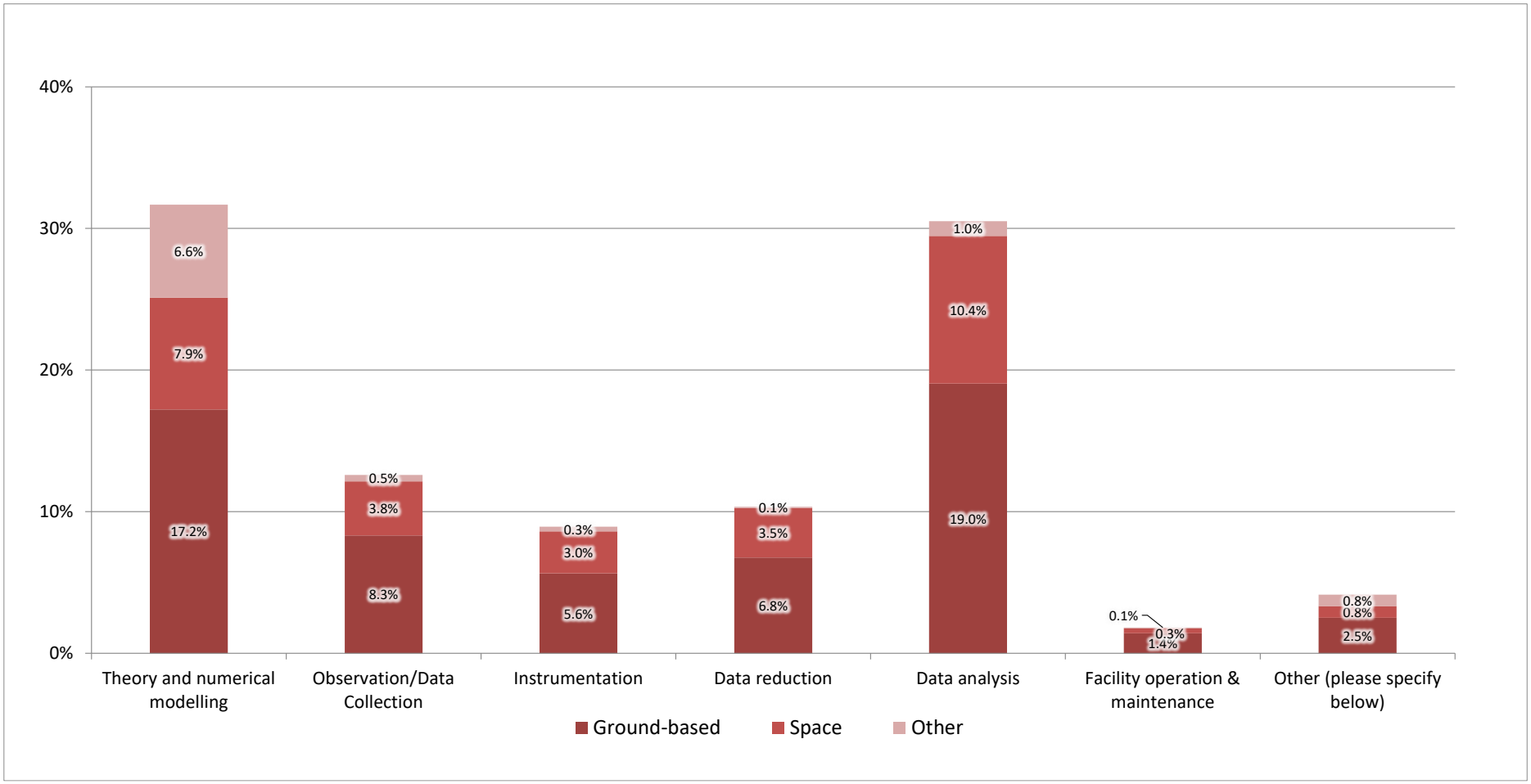

Figure 27: Proportion of effort spent on various general research activities by permanent staff and fixed-term researchers with research interests in astronomy, 2023

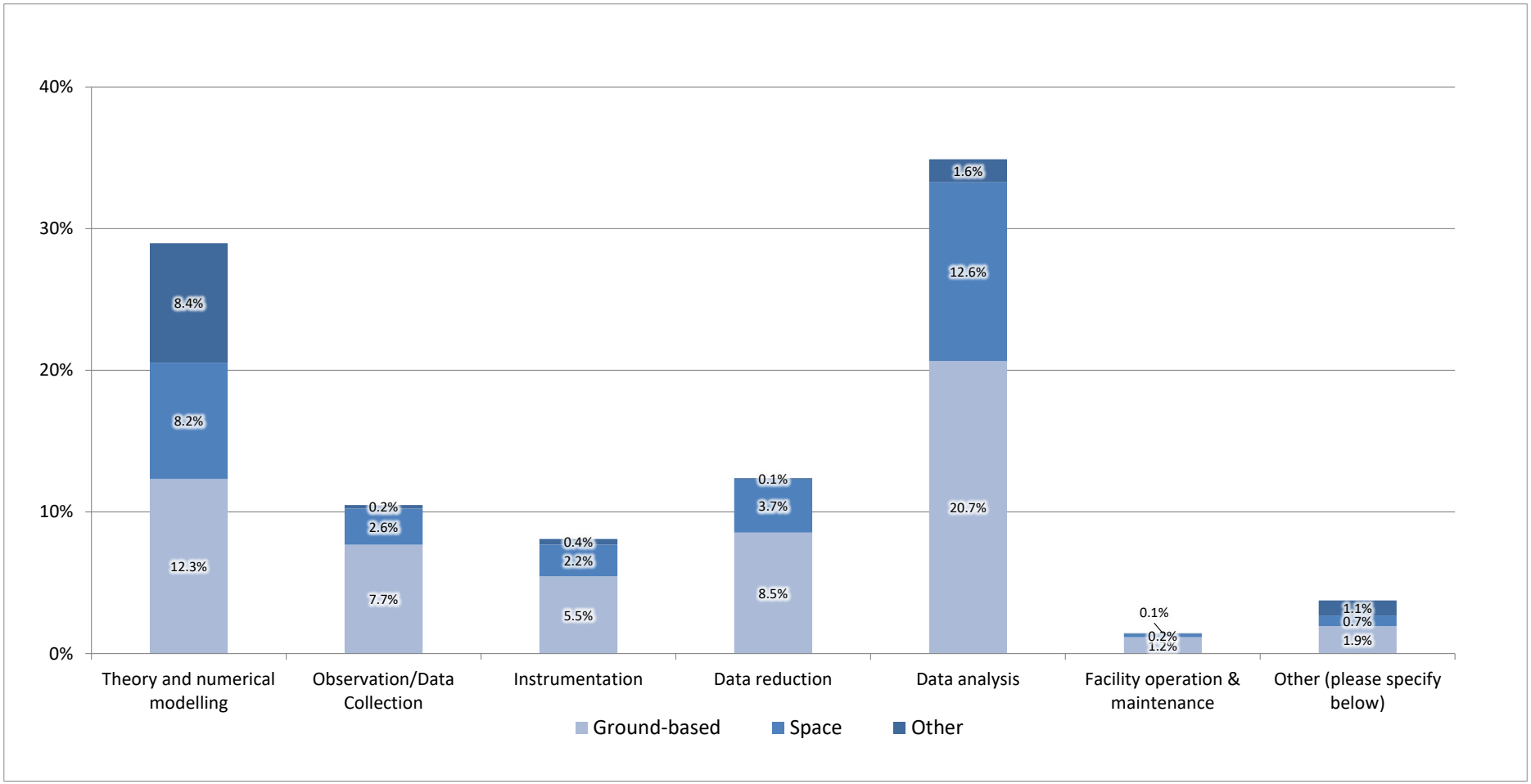

Figure 28: Proportion of effort spent on various general research activities by permanent staff and fixed-term researchers with research interests in astronomy, 2016

Figure 29 shows just the relative proportions of effort devoted to facilities in different wavelength regions from the current study and that from the 2016, 2010 and 1998 surveys, and

Over a period 25 years the major changes have been a fall in the amount of effort devoted to work at X-ray wavelengths from 20% to 9% and an increase in effort devoted to optical wavelengths from 33% to 41%. There have been variations in efforts at particular wavelengths from survey to survey. For example, IR work was more popular in 2010, mm and sub-mm and UV work were more popular in 2016, and optical work fell in popularity in 2016.

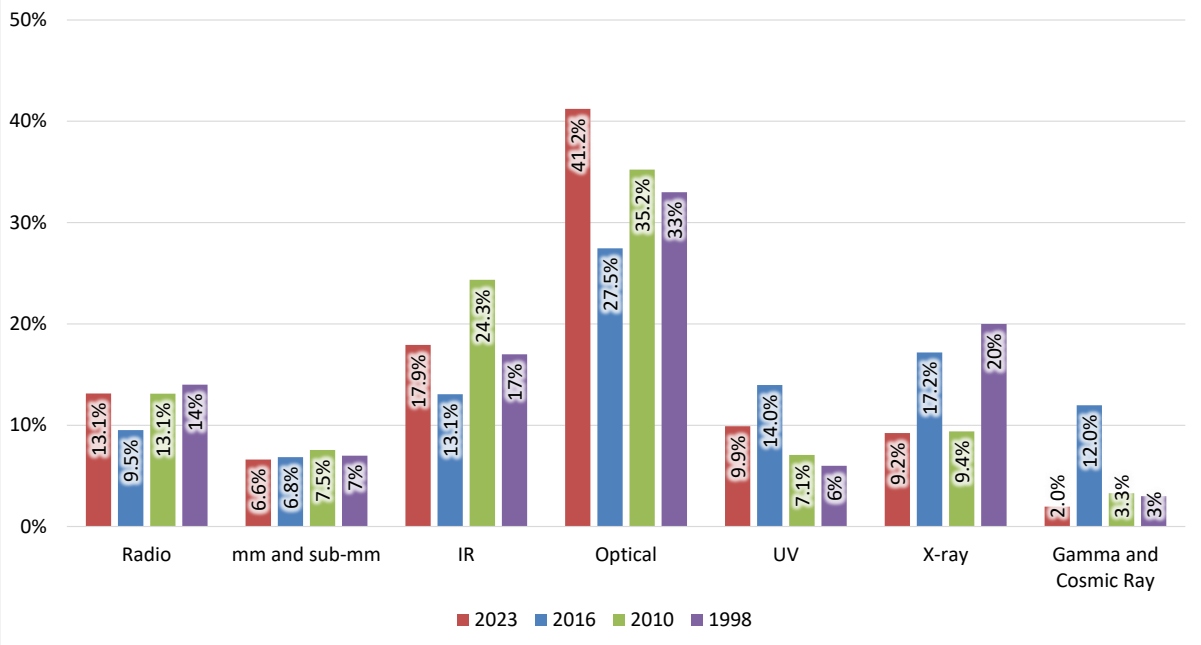

Figure 29: Relative proportions of effort devoted to facilities in different wavelength regions by the astronomy community from the current study and that from the 1998, 2010 and 2016 surveys. Data are shown as time divided between named wavelength regions.

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, postdoctoral 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 (17.2%)*, *Stars* (13.8%), *Cosmology (9.5%) and Radio, sub millimetre, infrared sources or background* (8.8%) which is the same order as in 2016 and 2010. The most popular areas within *Galactic and Extragalactic Research* are *Formation and Evolution* (27.7% within the sub-field), *Normal Galaxies* (19.8%) and *Active Galaxies* (17.7%). Within *Stellar Research* the most popular areas are *Formation and Evolution* (24.0% within the sub-field), *Binary Stars*

(20.7%), and *Variable (pulsating/eruptive) stars* (11.1%). Within *Cosmology Research*, the most popular research areas are *Large scale structure* (26.5% within sub-field), *Dark matter* (21.4%) and *Dark Energy* (16.8%).

Within *Solar System Science* the most popular research areas were *Cross Discipline - Space Weather* (10.9%), *Magnetosphere(s) (Induced Magnetospheres, Cometary Plasmas)* (9.9%), *Solar Studies* (8.1%), and *Planetary atmospheres* (7.9%). Of those who indicated their interests in planetary science, 25.9% (within the sub-field) indicated an interest in the *Earth*, 13.2% in *Mars*, and *11.3%* in *Jupiter.* In total 25.1% indicated an interest in the *Gas Giants*

Within *Solid Earth Geophysics* the most popular research areas are *Seismology* (15.7%), *Physics of the Earth's Interior* (12.9%) and *Earth Structure* (12.0%).

4.6 Facilities

Permanent staff and postdoctoral researchers who responded to the individual questionnaire were asked to indicate which major facilities they had used in the UK and abroad within the last 24 months. Respondents were presented with a list of the most popular facilities listed by respondents to the 2016 survey, supplemented by other facilities which had come online since 2016, and were invited to indicate which of those facilities that they had used and to list other facilities they had used.

The facilities reported used by 10 or more permanent staff in the previous 24 months are presented in Figure 30 and the equivalent plots of facilities reported used by permanent staff in the 2010 and 2016 surveys are shown in Figure 31 and Figure 32, respectively.

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.

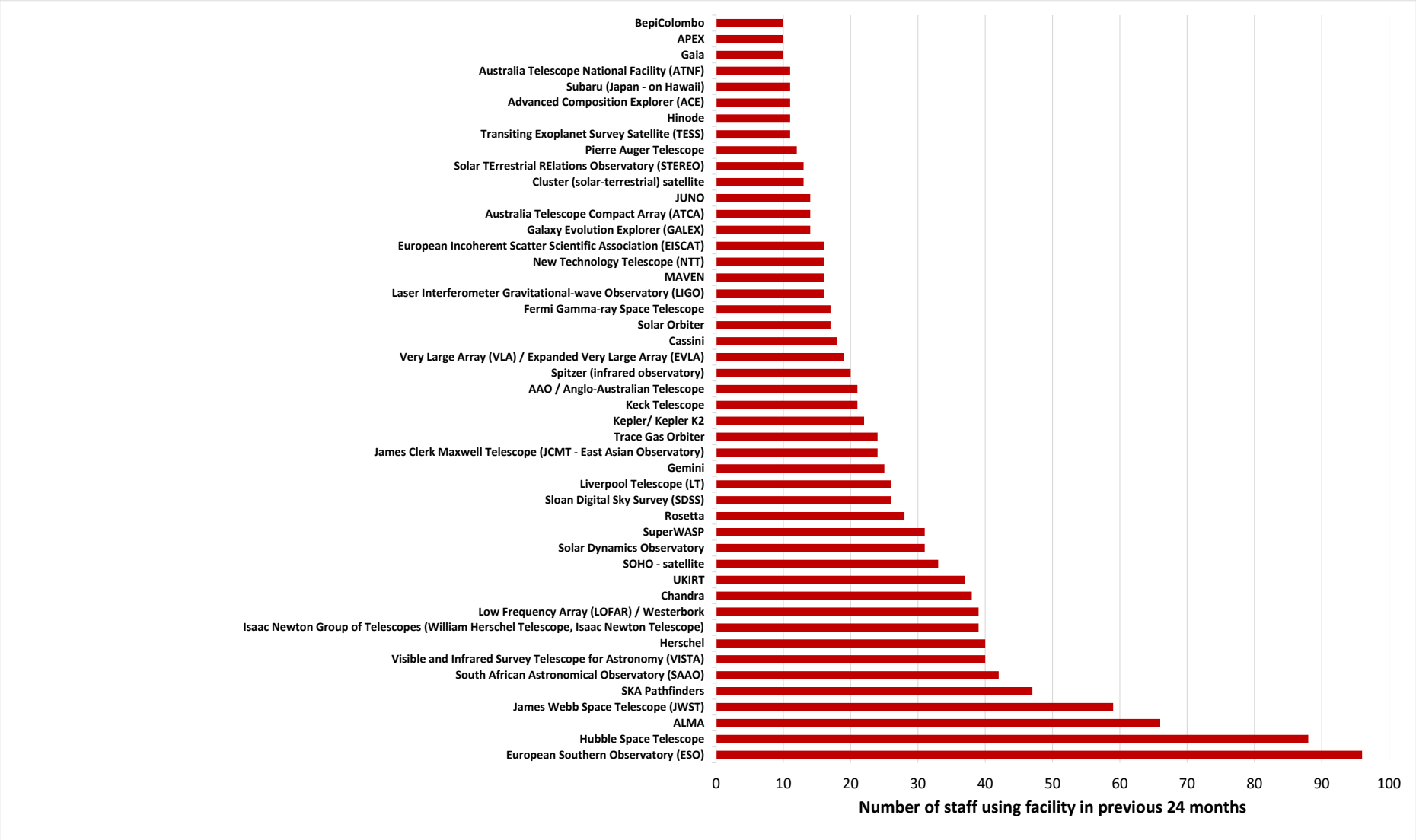

Figure 30: The facilities most frequently used by permanent staff in astronomy and geophysics in the previous 24 months, 2023 (A number of ESO instruments are listed separately from the ESO, i.e., APEX, ALMA, NTT, VISTA)

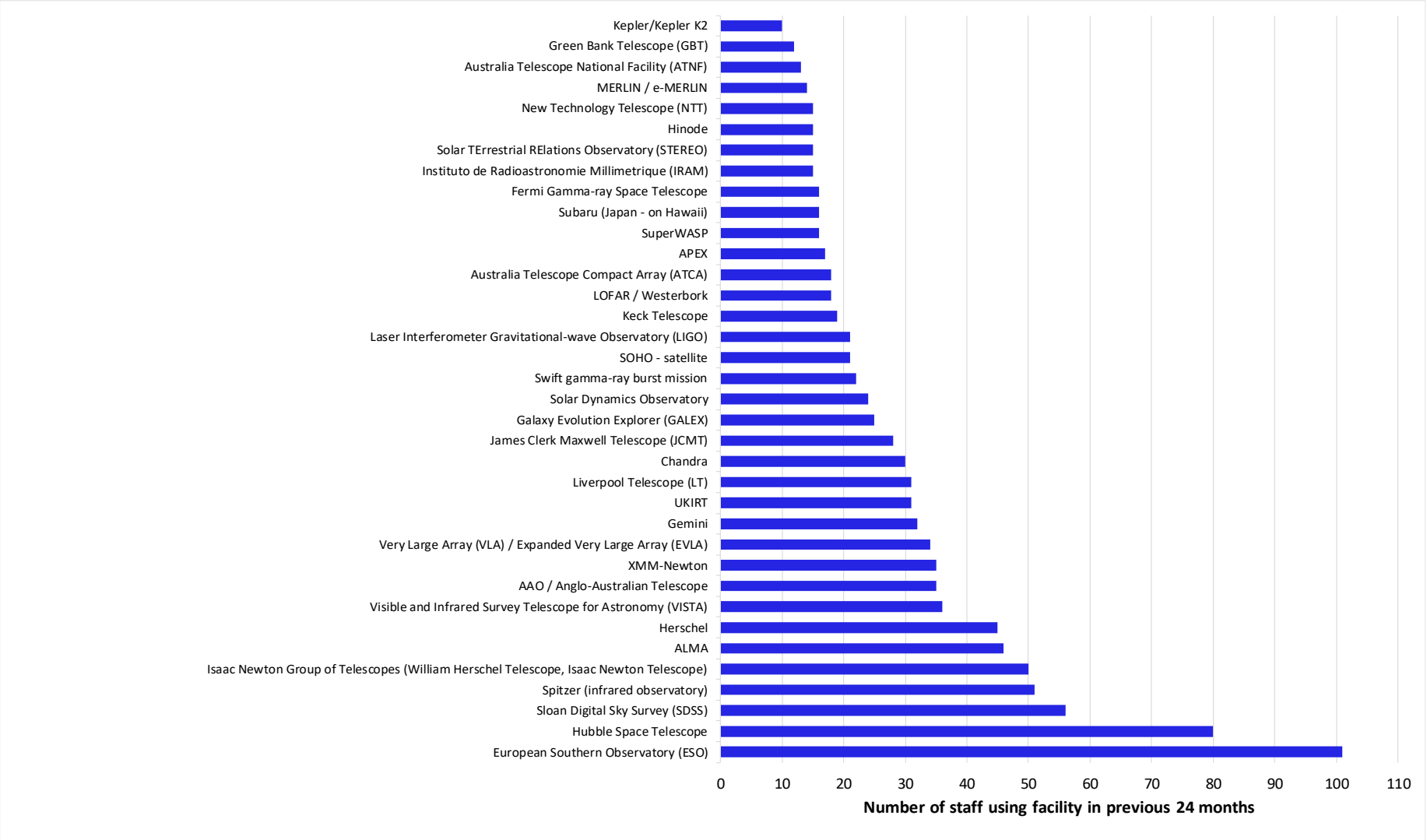

Figure 31: The facilities most frequently used by permanent staff in astronomy and geophysics in the previous 24 months, 2016 (A number of ESO instruments are listed separately from the ESO, i.e., APEX, ALMA, NTT, VISTA)

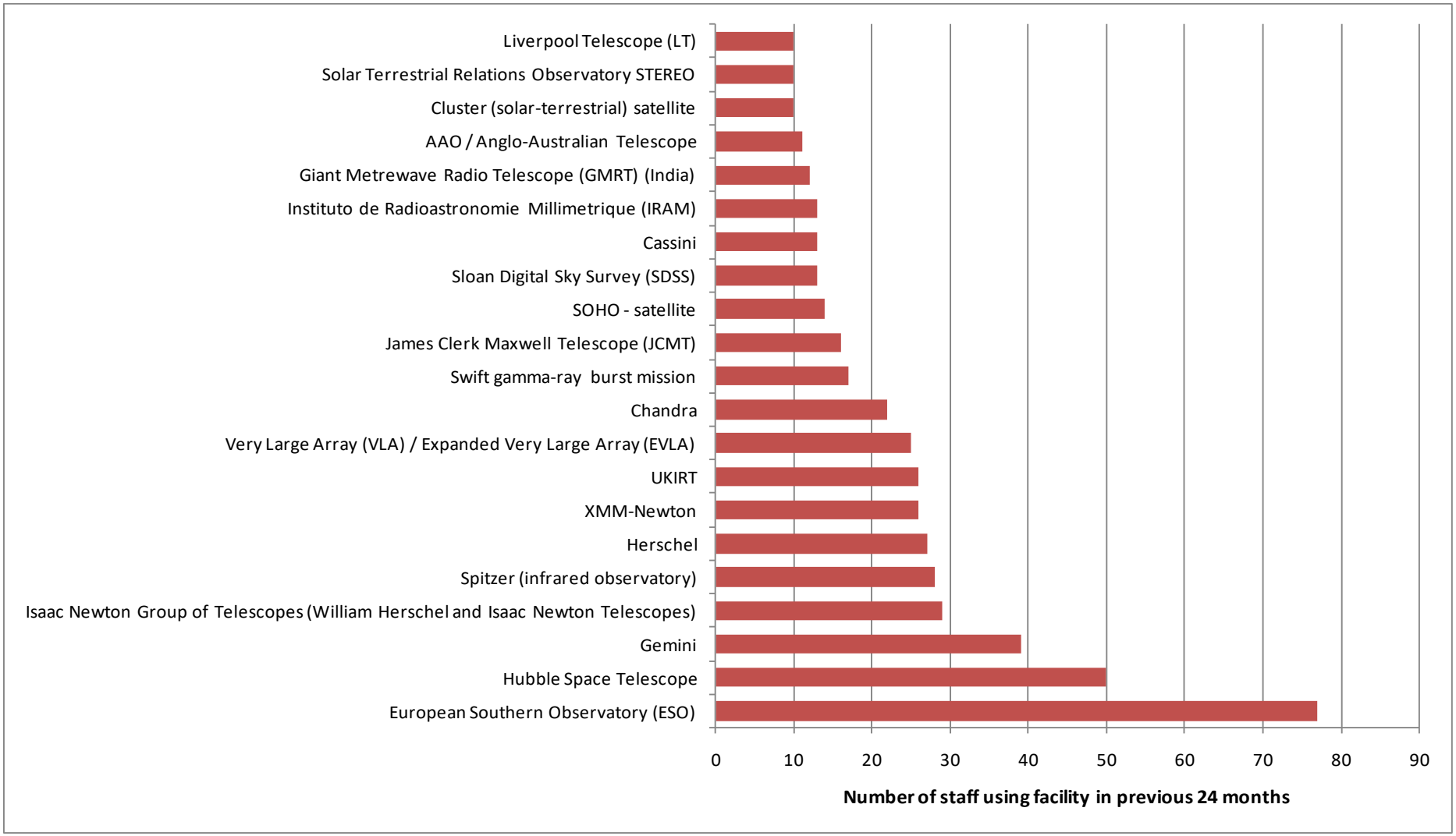

Figure 32: The facilities most frequently used by permanent staff in astronomy and geophysics in the previous 24 months, 2010

Table 64: Proportion of permanent staff* using each instrument by gender, 2023

Instrument**	All (N=330)	Women (N=81)	Men (N=233)	Non-binary (N=6)	DNWTS (N=10)
AAO / Anglo-Australian Telescope	6%	2%	8%	0%	10%
Advanced Composition Explorer (ACE)	3%	0%	4%	0%	0%
ALMA	19%	23%	18%	0%	20%
APEX	3%	6%	2%	17%	0%
Artemis cubesats	0%	0%	0%	0%	0%
Australia Telescope Compact Array (ATCA)	4%	6%	3%	0%	20%
Australia Telescope National Facility (ATNF)	3%	0%	3%	0%	30%
BepiColombo	3%	5%	2%	0%	0%
Cassini	4%	5%	4%	0%	0%
Chandra	11%	11%	11%	50%	0%
Cluster (solar-terrestrial) satellite	3%	2%	4%	0%	0%
Curiosity	1%	1%	0%	0%	0%
DART	2%	0%	3%	17%	0%
European Incoherent Scatter Scientific Association (EISCAT)	4%	2%	5%	0%	0%
European Southern Observatory (ESO)	28%	27%	29%	0%	30%
FAST (Radiotelescope)	1%	0%	1%	0%	0%
Fermi Gamma-ray Space Telescope	5%	2%	6%	0%	0%
Galaxy Evolution Explorer (GALEX)	4%	2%	4%	17%	10%
Gemini	7%	7%	8%	0%	0%
Giant Metrewave Radio Telescope (GMRT) (India)	2%	1%	2%	17%	10%
Green Bank Telescope (GBT)	3%	2%	3%	0%	10%
Herschel	12%	10%	13%	0%	20%
Hinode	3%	2%	3%	0%	10%
Hubble Space Telescope	26%	23%	27%	33%	20%
InSight	3%	7%	1%	0%	0%
Instituto de Radioastronomie Millimetrique (IRAM)	2%	2%	3%	0%	0%
Isaac Newton Group of Telescopes (William Herschel Telescope, Isaac Newton Telescope)	12%	11%	12%	0%	10%
James Clerk Maxwell Telescope (JCMT - East Asian Observatory)	7%	7%	7%	0%	20%
James Webb Space Telescope (JWST)	17%	10%	20%	33%	0%
JUNO	4%	5%	4%	0%	0%
Keck Telescope	6%	9%	6%	0%	0%
Kepler/ Kepler K2	6%	5%	7%	0%	0%
Laser Interferometer Gravitational-wave Observatory (LIGO)	5%	2%	6%	0%	0%
Liverpool Telescope (LT)	8%	6%	9%	0%	0%
LOFAR / Westerbork	12%	10%	11%	50%	20%
LRO	2%	2%	0%	17%	10%
MAVEN	2%	4%	2%	0%	0%

MERLIN / e-MERLIN	5%	5%	5%	0%	0%
New Horizons	1%	0%	1%	0%	0%
New Technology Telescope (NTT)	2%	1%	3%	0%	0%
Parker Solar Probe	5%	7%	4%	0%	0%
Perserverance	1%	1%	1%	0%	0%
Pierre Auger Telescope	0%	0%	0%	0%	0%
Rosetta	3%	5%	3%	0%	0%
SKA Pathfinders	8%	10%	8%	17%	10%
Sloan Digital Sky Survey (SDSS)	14%	21%	11%	33%	10%
SOHO - satellite	7%	2%	8%	0%	10%
Solar Dynamics Observatory	10%	7%	11%	0%	10%
Solar Orbiter	8%	9%	9%	0%	10%
Solar TErrestrial RElations Observatory (STEREO)	5%	2%	5%	0%	10%
South African Astronomical Observatory (SAAO)	4%	2%	5%	0%	0%
Spitzer (infrared observatory)	13%	15%	12%	17%	10%
Subaru (Japan - on Hawaii)	6%	6%	5%	17%	20%
SuperWASP	3%	2%	4%	0%	0%
Swift gamma-ray burst mission	8%	5%	9%	0%	10%
Trace Gas Orbiter	1%	1%	0%	0%	0%
UKIRT	7%	5%	8%	0%	10%
Very Large Array (VLA) / Expanded Very Large Array (EVLA)	11%	12%	9%	33%	30%
Visible and Infrared Survey Telescope for Astronomy (VISTA)	6%	5%	6%	0%	10%
XMM-Newton	11%	12%	10%	17%	10%

* The proportions of permanent staff are shown as the proportions of permanent staff who indicated that they use at least one instrument

** The analysis only uses data for the instruments listed in the individual questionnaire

Comparison of the numbers of permanent staff responding to the 2010, 2016 and 2023 surveys shows fewer permanent staff responded to the 2016 than the 2010 survey, but permanent staff respondent numbers increased in 2023 (see Table 65). In 2010 permanent staff mentioned 1002 instances of facilities having been used in the previous 24 months, in 2016 permanent staff mentioned 1264 instances, and in 2023 permanent staff respondents mentioned 1633 instances. The data suggest that a wider range of facilities were used in 2023 and 2016, than in 2010.

Table 64 shows the proportion of permanent staff who reported using each instrument. The analysis excludes instruments respondents listed themselves and is limited to the instruments listed in the individual questionnaire. Proportions of staff are calculated using numbers of staff who indicated that they have used at least one instrument in the last 24 months. Patterns of instrument usage are similar for women and men but there are a few notable differences. Specifically, 10% of women and 20% of men reported using the James Webb Space Telescope and 11% of women and 21% of men reported using the Sloan Digital Sky Survey.

Table 65: Comparison of the broad research interests of permanent staff in 2010, 2016 and 2023

Broad research area*	Count of permanent research staff		
	2010 (N=392)	2016 (N=363)	2023 (N=497)
Astronomy: Astronomy and/or Astrophysics	237	249	313
Astronomy: Particle Astrophysics	34	24	31
Solar System: Planetary Science	56	46	75
Solar System: Earth Observation	10	6	10
Solar System: Atmospheric Science	17	12	15
Solar System: The Sun	31	34	48
Solar System: Solar-Terrestrial Physics	39	25	58
Solar System: Cross Discipline Topics	17	7	14
Geophysics: Solid Earth Geophysics	59	43	44
Other Related Subject	43	4	8
Instances of facilities mentioned	1002	1264	1633
Ratio of Instances of facilities mentioned and Number of permanent staff	2.6	3.5	3.3

* Respondents were able to indicate more than one research area

5 Conclusions

5.1 Departmental and research establishment questionnaires

19 university departments/research groups returned the questionnaire. Data for a further 62 university departments were taken from their websites. No research establishments returned the questionnaire. Staff data for six research establishments were collected from their websites but a further two research establishment websites did not have staff.

Astronomy is the most populous research area in universities with 1420 staff (academic staff, fixed-term and permanent research staff, and technical and support staff), followed by solid Earth geophysics with 591 staff and solar system science with 442 staff. 293 staff were recorded as working in cross-disciplinary areas.

Within research establishments, the most populous area is solid Earth geophysics with 603 staff (permanent research/scientific staff, and technical and support staff).

Among academic staff, as in 2010 and 2016 there is a high proportion of professors in all research areas: 55% of astronomy staff on academic grades are professors, 50% of staff in solar system science, 58% of staff in solid Earth geophysics, and 53% of staff in cross disciplinary areas. As in 2010 and 2016, on average these figures are higher than the proportion of professors in the physics cost centre, which stood at 50% in 2021/22.[14] It was noted in the 2010 and 2016 reports that the number of professors has risen significantly since 1993, and the number has risen steadily since then: considering academic staff on teaching and research contracts, the FTEs of professors has risen from 850 in 2015/16 to 1030 in 2021/22. This is also the case in physics overall in which the number of staff at all academic grades has risen: considering academic staff on teaching and research contracts, the FTEs of academic staff has risen from 1940 in 2015/16 to 2070 in 2021/22. The number of lecturers has also fallen, having remained steady between 1998 and 2010 and risen to 2016: considering lecturers on teaching and research contracts, the FTEs of lecturers has fallen from 490 in 2015/16 to 410 in 2021/22

Overall, the number of academic staff with research interests in astronomy and solar system science has risen from 292 in 1993, through 312 in 1998, 514 in 2010, 641 in 2016, to 905 in 2023.

As was noted in 2016, it is difficult to explain why the numbers of academic staff in the areas of interest to this study continue to rise. Data presented in the 2010 report suggested that astronomy-related undergraduate courses were a popular option, and it is a possibility that the supply line of potential researchers continues to be strong. As before, it remains 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 other degree courses. The Higher Education Statistics Agency (HESA)

[14] Higher Education Statistical Agency (HESA) Staff Data 2021/22. Data analyses as FTEs (not headcounts) for staff with a teaching and research employment function.

collects data on the full-time equivalent (FTEs) students taking course in specific subjects including astronomy and physics. Higher Education Institutes can classify their degree courses as they see fit. Hence some caution needs to be shown when considering data on numbers of students reading astronomy.

Data in Table 66 show a headcount of undergraduate students spending at least 50% of their time reading physics or astronomy as part of their first-degree studies up to 2016/17 and data in Table 68 shows similar data but just for those in their first year. Table 67 shows total FTEs of undergraduate students reading physics or astronomy as part of their first-degree studies from 2017/18 and Table 69 shows similar data but just for those in their first year. It should be noted that not all astronomy modules in physics departments will be labelled as astronomy and so the astronomy headcount and FTE totals are likely to be an under-estimate. The data suggest that the headcount of those reading physics has increased over the period under consideration, while the headcount of those reading astronomy has fallen.

Table 66: Headcount of student registered in all years of physics or astronomy first degree courses in UK institutions for 0.5 FTE or more of their time

Subject	Degree	Gender	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Physics	First Degree	Women	1645	1445	1460	1575	1745	1855	2010
		Men	5665	5355	5415	6045	6480	6850	7130
	Enhanced First Degree	Women	1475	1625	1720	1890	2000	2135	2255
		Men	5760	6420	6835	7445	7795	8040	7840
	Total	Women	3120	3075	3180	3465	3745	3990	4270
		Men	11425	11775	12250	13485	14275	14885	14970
Astronomy	First Degree	Women	455	365	295	255	205	235	265
		Men	1480	1155	865	780	660	670	770
	Enhanced First Degree	Men	405	415	475	475	515	560	545
		Women	150	175	190	220	245	240	250
	Total	Women	605	535	485	480	450	475	520
		Men	1885	1575	1340	1255	1175	1230	1320

Table 67: FTEs of students registered in all years of physics or astronomy first degree courses in UK institutions

Subject	Degree	Gender	2017/18	2018/19	2019/20	2020/21	2021/22
Physics	First Degree	Women	1840	1965	2280	2495	2555
		Men	6060	6255	6775	7095	6915
	Enhanced First Degree	Women	2210	2190	2165	2235	2225
		Men	7315	7040	6830	6790	6485
	Total	Women	4050	4155	4445	4730	4780
		Men	13375	13295	13605	13885	13400
Astronomy	First Degree	Women	300	325	335	380	425
		Men	760	795	770	860	900
	Enhanced First Degree	Women	285	300	330	415	440
		Men	630	645	655	760	795
	Total	Women	585	625	665	795	865
		Men	1390	1440	1425	1620	1695

Table 68: Headcount of students registered in the first-year of physics or astronomy first degree courses in UK institutions for 0.5 FTE or more of their time

Subject	Degree	Gender	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Physics	First Degree	Women	485	400	475	530	650	655	670
		Men	1850	1735	1785	2325	2330	2370	2245
	Enhanced First Degree	Women	480	520	505	590	620	660	675
		Men	1740	2125	1985	2200	2195	2200	2060
	Total	Women	965	920	975	1120	1270	1320	1350
		Men	3590	3860	3770	4525	4525	4570	4305
Astronomy	First Degree	Women	110	95	70	55	50	90	90
		Men	380	320	195	160	165	245	225
	Enhanced First Degree	Women	45	60	50	60	70	60	65
		Men	115	120	135	105	130	160	120
	Total	Women	160	155	125	115	115	155	155
		Men	490	440	330	265	295	400	345

Table 69: FTEs of students registered in the first-year of physics or astronomy first degree courses in UK institutions

Subject	Degree	Gender	2017/18	2018/19	2019/20	2020/21	2021/22
Physics	First Degree	Women	650	685	805	820	850
		Men	1965	2100	2260	2370	2275
	Enhanced First Degree	Women	605	580	555	590	520
		Men	1910	1825	1675	1730	1520
	Total	Women	1255	1265	1360	1410	1370
		Men	3875	3925	3935	4100	3795
Astronomy	First Degree	Women	100	105	110	115	140
		Men	215	240	225	275	300
	Enhanced First Degree	Women	85	85	95	110	105
		Men	170	170	165	195	210
	Total	Women	185	190	205	225	245
		Men	385	410	390	470	510

Comparing acceptances onto physics courses and astronomy-related courses (astrophysics, cosmology, space science, astronomy and planetary science) between 2002 and 2014 and 2018 to 2022 using data supplied by the University and College Admissions Service (UCAS), and analysed by the RAS, shows that physics acceptance rose from 3779 to 4495 in 2010, and then to 6035 in 2014, and then acceptances were 5830 in 2018 rising to a peak of 6050 in 2020 before falling to 5665 in 2022 (Figure 33). Acceptances onto astronomy-related courses fell from 879 to 696 between 2003 and 2010, but then rose to 1005 in 2014. Thereafter, acceptances were 1455 in 2018 and rose to 1795 in 2022 (Figure 34).[15]

The UCAS data shows that the proportion of acceptances who are women on astronomy-related courses has increased from 30% to 32% between 2018 and 2022, while for physics the proportion increased from 25% to 27%.

The UCAS data suggest that numbers on astronomy-related courses have continued to rise and in 2022 are double what they were in 2003 and hence the supply of students from UK higher education institutions into PhD courses, and the potential supply of astronomy researchers, remains healthy.

[15] R. Massey, Private communication.

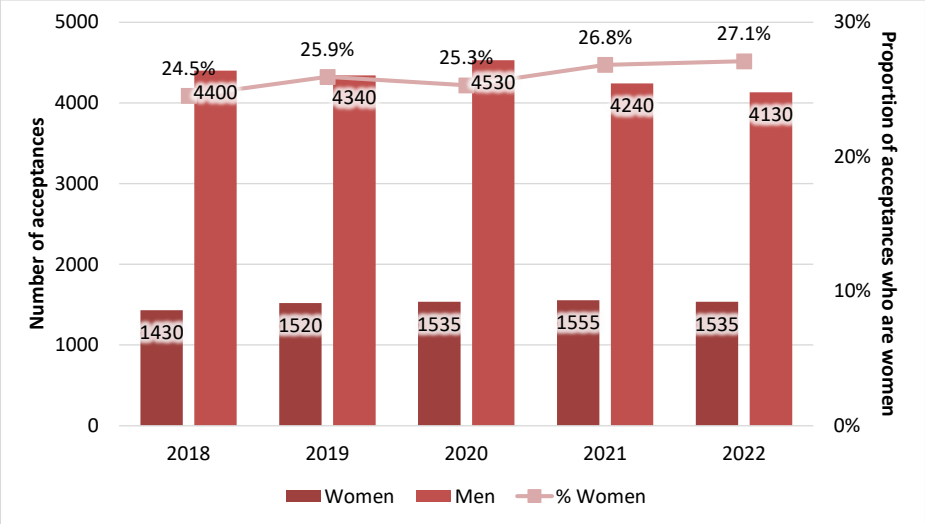

Figure 33: Acceptances onto physics courses by gender, 2018 to 2022

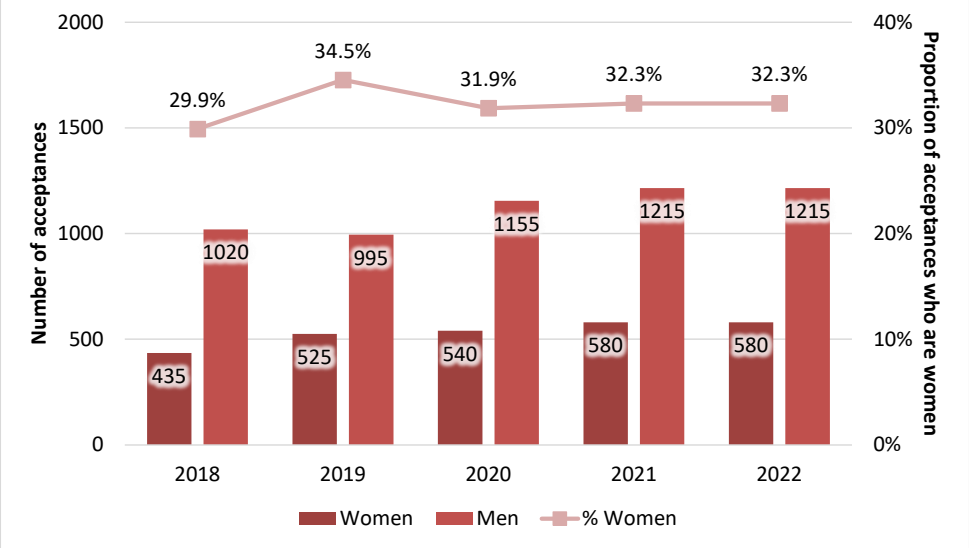

Figure 34: Acceptances onto astronomy-related courses by gender, 2018 to 2022

The number of postdoctoral researchers in universities (those on open-ended, fixed-term and unknown contract type) in astronomy and solar system science has continued to rise and now stands at 735 compared to 524 in 2010. The ratio of research-only to academic (teaching and research staff) staff in astronomy and solar system science has risen from 0.98 in 2010, to 1.07 in 2016, and 1.23 in 2023.

The number of recorded technical staff has risen. 154 permanent and 22 fixed-term technical staff were recorded in 2023.

In astronomy 13% of professors, 28% of Senior Lecturers/ Readers and 29% of lecturers are women, in solar system science 20% of professors, 22% of Senior Lecturers/ Readers and 28% of lecturers are women, and in geophysics 17% of professors, 31% of Senior Lecturers/ Readers and 19% of lecturers are women. Comparing the data for 2016 and 2023 shows that there have

been some changes in women's representation. At Lecturer level representation has remained steady in astronomy, has risen in solar system science and has fallen in solid Earth geophysics. Representation at Senior Lecturer/ Reader has increased in all three areas and at Professorial level representation has increased in astronomy and solid Earth geophysics and feel in solar system science.

As noted in 2010 and 2016, comparison with data for physics shows that in the research areas under consideration, the proportions of staff who are women are higher suggesting that women are more likely to work in (academic) astronomy and geophysics than in physics.

Astronomy, solar system science and geophysics continue to attract a higher proportion of women than physics, and in fact at student levels attracts a higher proportion of women than might be expected given only around 20% of entrants to A level physics are women.

In 2023, as in 2016 and 2010, the median age for research staff was 30-34 years and the median age for academic staff was 45-49 years as in 2016 but in contrast to 2010 when it was 40-44 years.

The median ages for each grade are: 30-34 years for fixed-term research staff (2010 and 2016: 30-34 years), 40-49 years for research staff on open-ended contracts (2010: 30-34 years; 2016: 35-39 years), 35-39 years for lecturers (2010 and 2016: 35-39 years), 45-49 years for senior lecturers/readers (2010 and 2016: 40-44 years), and 50-54 years for professors (2010: 55-59 years; 2016: 50-54 years).

Compared to 2016, the permanent academic staff are on average about the same age and the research staff are on average slightly older. Also, as in 2010 and 2016, the proportion of staff who are women falls with age.

The total number of research students in 2023 is 2000 compared to 2013 in 2016 and 1232 in 2010. Recorded numbers have risen in astronomy, from 869 in 2010 to 1112 in 2016 and 1161 in 2023, in solar system science from 152 to 177 and then to 341, and in solid Earth geophysics from 169 to 625 to 417.

63% of research students are full-time and domiciled in the UK. Only 5% of students were studying part-time in 2023, a similar proportion to the 4% that were doing so in 2016. The proportion of women among non-UK domiciled students (42%) also remained higher than that among UK-domiciled students (31%) as it had it 2016 and 2010.

The headcount of the astronomy research community (here a combination of the astronomy and solar system science research areas) under consideration in 2023 is 3387compared to 2866 in 2016 and 2060 in 2010. The figure presented is likely to represent a real growth in the size of the community as coverage for astronomy was similar in 2023, 2016 and 2010, albeit for 2023 data for some research establishments were not available.

The geophysics community is 1611 in 2023 compared to 2050.5 in 2016 but only 357 in 2010. The coverage of geophysics in the 2023 and 2016 studies has been much more thorough than

that in 2010 and consequently the significantly higher figures for the size of the solid Earth geophysics community in 2023 and 2016 should be regarded as a better estimate of the size of the community than the low figure in 2010.

388 people were identified as being in cross disciplinary areas in 2023 compared to 381 in 2016 and 204 in 2010.

For permanent academic staff, the most common reason for leaving was retirement. 42% of those whose leaving destinations are known retired. 49% moved to other academic/research jobs.

For permanent academic staff with known leaving destinations, the most common reason for leaving was retirement. 31% of those whose leaving destinations are known retired. 51% moved to other academic/research jobs.

Among fixed-term researchers in astronomy and geophysics for whom leaving destinations are known, 76% moved on to roles within academia or research institutes. Only about 19% of fixed-term research staff moved to roles in industry. There were no significant differences observed in the known destinations of men and women. These patterns are very like those found in 2016 and 2010, suggesting little has changed in the patterns of leaving destinations of research staff.

5.2 Individual Questionnaires

As in 2016 and 2010, 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:

- 74% of permanent staff are British, 15% are from European Union countries, 3% are from the USA, and 5% are from other countries;
- 95% of permanent staff specified their ethnicity as White. When only British respondents are considered, 97% are White;
- 93% of staff who indicated their sexual orientation reported themselves as heterosexual or straight, 3% as gay or lesbian and 3% as bisexual;
- 72% of those who disclosed their religious beliefs stated that they had no religion/were atheists, and 25% reported that they were Christian;
- All grades of academic staff spend between 26 and 36% of their time on research activities. Lecturers, senior lecturers and readers spend more time on undergraduate teaching than professors.

Analysis of data relating to postdoctoral research associates show that:

- 62% of postdoctoral research associates had completed their PhD within the last 4 years, and 72% with the last 5 years;
- Overall, 53% of respondents are British, and, of these, 88% of those who indicated their ethnicity are White. 21% of the sample are of European Union nationalities and 100% of

those who indicated their ethnicity are White. 20% of the sample indicated that they held citizenship outside Britain or the European Union;

- 71% of those who disclosed their beliefs stated that they had no religion/were agnostic, and 20% reported that they were Christian;
- 87% who indicated their sexual orientation reported themselves as heterosexual or straight, 3% as gay or lesbian and 2% as bisexual;
- On average postdoctoral research associates spend 81% of their time on research activities which is more than double the proportion of time spent by permanent academic staff.

For postgraduate research students:

- 67% of postgraduate research students are British, 16% are from elsewhere in the European Union, and 3% are from the USA;
- 92% of the British who indicated their ethnicity are White. 86% of those of nationalities of European Union countries who indicated their ethnicity are White;
- 78% of those who disclosed their beliefs stated that they had no religion, and 14% reported that they were Christian;
- 61% who indicated their sexual orientation reported themselves as heterosexual or straight, 6% as gay or lesbian and 19% as bisexual. There were large differences in the reported sexual orientations of women and men;
- Most astronomy and solar system science British students (57%) receive funding from the STFC. In contrast, most British solid Earth geophysics students receive their finding from NERC (44%) and another 31% from the EPSRC.

68% of all respondents indicated that they have research interests in an Astronomy research area with 67% of the whole sample indicating an interest in *Astronomy and/or Astrophysics* and 4% indicating an interest in *Particle Astrophysics*, 33% indicated an interest in some aspects of *Solar System Science*, and 7% indicated an interest in *Geophysics*.

65% of permanent staff respondents indicated that they have interests in some aspect of *Astronomy*, 33% indicated an interest in some aspects of *Solar System Science*, and 10% indicated an interest in *Geophysics*.

69% of postdoctoral research associates indicated that they have interests in some aspect of *Astronomy*, 32% indicated an interest in some aspects of *Solar System Science*, and 7% indicated an interest in *Geophysics*.

71% of postgraduate research students indicated that they have interests in some aspect of *Astronomy*, 33% indicated an interest in some aspects of *Solar System Science*, and 2% indicated an interest in *Geophysics*.

Combined data for permanent staff and research staff on open-ended and fixed-term contracts for the proportion of total effort expended on each general research activity shows that 31% of effort is expended on *Theory and numerical modelling* and 36% on *Data analysis*, 11% on

Observation/Data Collection, 9% on *Data reduction*, and 8% on *Instrumentation*, 2% on *Facility operation and maintenance* and 3% on *Other* activities. Activities are split 53%, 36% and 12% between *Ground-based*, *Space* and *Other* areas, respectively.

Consideration of the relative proportions of effort devoted to facilities in different wavelength regions show that between 2010 and 2023 shows that there has been an increase in the effort on the radio region to 16% from 11% in 2016 and to the optical region from 36% to 39%. There have been notable falls in the effort on the mm and sub-mm region from 14% to 7% and a fall in the effort on the UV region from 21% to 9%.

Overall, between 1998 and 2023 the main changes are a fall in the effort on the X-ray region from 20% to 9% and an increase in the effort on the optical region from 33% to 39%.

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 fields in astronomy, 2010, 2016 and 2023

Research Area	Count of research interests 2023				Relative popularity of research areas in astronomy		
	Permanent Staff	PDRs	Research Students	Total	2023	2016	2010
AA Historical and Educational research	17	0	2	**19**	1.3%	0.6%	1.0%
AB Positional astronomy/Celestial mechanics	11	4	7	**22**	1.5%	1.0%	1.3%
AC* Stars	104	38	58	**200**	13.8%	15.5%	14.8%
AD Interstellar matter	48	13	9	**70**	4.8%	5.9%	5.5%
AE Radio, sub millimetre, infrared sources or background	73	15	39	**127**	8.8%	8.7%	9.1%
AF UV/X-ray sources or background	31	16	15	**62**	4.3%	4.2%	6.4%
AG Gamma-ray sources or background	8	2	5	**15**	1.0%	1.0%	3.1%
AH Cosmic rays	5	1	6	**12**	0.8%	0.7%	1.5%
Al Particle astrophysics	17	0	6	**23**	1.6%	1.2%	2.7%
AJ Gravitational waves	40	12	19	**71**	4.9%	4.9%	3.3%
AK* Galaxies/Extragalactic	141	45	63	**249**	17.2%	18.5%	19.6%
AL* Cosmology	75	29	33	**137**	9.5%	11.0%	12.2%
AM Databases (incl Virtual Observatories)	24	11	9	**44**	3.0%	3.1%	3.3%
AN Physical data and processes	23	10	18	**51**	3.5%	2.6%	2.9%
AO Site testing — astronomical sites	5	4	1	**10**	0.7%	0.3%	0.8%
AP Circumstellar matter, debris disks, exoplanets	46	15	37	**98**	6.8%	7.0%	5.9%
CB Cross Discipline — Internal magnetic dynamos in stars and planets	3	2	3	**8**	0.6%	1.5%	1.0%
CC Cross Discipline — Helioseismology/Asteroseismology	6	3	0	**9**	0.6%	0.8%	1.0%
CE Cross Discipline — Plasma physics	25	10	13	**48**	3.3%	2.3%	1.6%
CF Cross Discipline - Space Weather	13	3	8	**24**	1.7%	0.7%	
CG Cross Discipline - Telescopes and Instrumentation	47	18	15	**80**	5.5%	4.8%	
Other astronomy area	40	13	15	**68**	4.7%	3.9%	2.8%

Table A2: Popularity of sub-fields in stellar research (AC Stars), 2010, 2016 and 2023

Research Area	Count of research interests 2023				Relative popularity of areas in stellar research		
	Permanent Staff	PDRs	Research Students	Total	2023	2016	2010
1 Binaries	50	19	24	93	20.7%	17.6%	19.9%
2 Interiors — Structure	18	7	4	29	6.4%	5.5%	5.4%
3 Atmospheres	21	10	9	40	8.9%	9.7%	9.1%
4 Formation and Evolution	54	21	33	108	24.0%	23.7%	19.9%
5 Pulsars	10	4	6	20	4.4%	3.8%	5.2%
6 Supernovae	22	8	10	40	8.9%	8.1%	10.3%
7 Planetary Nebulae	7	0	2	9	2.0%	3.4%	3.7%
8 Planetary Systems	21	6	15	42	9.3%	10.2%	9.1%
9 Variable (Pulsating/Eruptive)	29	9	12	50	11.1%	13.3%	12.6%
10 Other	11	3	5	19	20.7%	4.7%	4.7%

Table A3: Popularity of sub-fields in galactic/extragalactic research (AK Galaxies/Extragalactic), 2010, 2016 and 2023

Research Area	Count of research interests 2023				Relative popularity of areas in extragalactic research		
	Permanent Staff	PDRs	Research Students	Total	2023	2016	2010
1 Active Galaxies	63	13	30	**106**	17.7%	15.8%	18.3%
2 Clusters	39	5	15	**59**	9.8%	11.3%	13.9%
3 Normal Galaxies	76	24	19	**119**	19.8%	17.3%	17.8%
4 Quasars	41	9	15	**65**	10.8%	11.5%	11.0%
5 Formation and Evolution	89	33	44	**166**	27.7%	28.9%	26.4%
6 Interactions	32	12	10	**54**	9.0%	11.3%	9.2%
7 Other	16	6	9	**31**	5.2%	4.0%	3.3%

Table A4: Popularity of sub-fields in cosmology research (AL Cosmology), 2010, 2016 and 2023

Research Area	Count of research interests 2023				Relative popularity of areas in cosmology research		
	Permanent Staff	PDRs	Research Students	Total	2023	2016	2010
1 Cosmic Microwave Background	17	7	8	**32**	10.4%	11.1%	12.1%
2 Relativity	8	4	6	**18**	5.8%	6.6%	6.9%
3 Dark Matter	37	17	12	**66**	21.4%	17.4%	25.6%
4 Gravitational Lenses	27	9	6	**42**	13.6%	11.1%	13.4%
5 Large Scale Structure	51	15	16	**82**	26.5%	27.6%	32.8%
6 Dark Energy	32	7	13	**52**	16.8%	18.3%	
7 Other	10	3	4	**17**	5.5%	7.8%	9.2%

Table A5: Popularity of research fields in solar system science (including the Earth as a Planet), 2010, 2016 and 2023

Research Area	Count of research interests 2023				Relative popularity of research areas in solar system science		
	Permanent Staff	PDRs	Research Students	Total	2023	2016	2010
SA Solar System — origin/evolution	22	6	9	**37**	4.8%	8.0%	5.9%
SB Meteorites/Comets	31	10	12	**53**	6.8%	7.6%	5.1%
SC Solar studies	41	8	14	**63**	8.1%	11.9%	9.1%
SD Heliospheric studies	26	5	8	**39**	5.0%	4.3%	4.5%
SE* Magnetosphere(s) (Induced Magnetospheres, Cometary Plasmas)	48	8	21	**77**	9.9%	6.1%	10.4%
SF* Ionosphere/Thermosphere (incl radio propagation)	34	11	13	**58**	7.5%	3.9%	6.2%
SG* Planetary atmospheres	29	12	20	**61**	7.9%	7.2%	7.9%
SH* Planetary surface features	20	6	9	**35**	4.5%	5.9%	5.7%
SI* Planetary sub-surface (incl search for water)	15	3	6	**24**	3.1%	4.8%	3.4%
SJ* Planetary interiors	18	4	11	**33**	4.2%	4.6%	3.8%
SK* Exobiology	12	0	7	**19**	2.4%	3.7%	4.0%
SL Earth — Middle atmosphere and climate	10	6	6	**22**	2.8%	2.0%	5.3%
SM Earth - Lower atmosphere (incl Oceanography)	4	3	2	**9**	1.2%	2.2%	4.3%
CA Cross Discipline — Earth and planetary atmospheres	12	6	7	**25**	3.2%	3.5%	4.3%
CB Cross Discipline — Internal magnetic dynamos in stars and planets	4	3	4	**11**	1.4%	2.6%	2.1%
CC Cross Discipline — Helioseismology/Asteroseismology	2	0	0	**2**	0.3%	0.9%	1.3%
CD Cross Discipline — Sun-climate studies	2	2	2	**6**	0.8%	1.3%	2.8%
CE Cross Discipline — Plasma physics	34	12	18	**64**	8.2%	8.0%	9.6%
CF Cross Discipline - Space Weather	54	14	17	**85**	10.9%	4.8%	
CG Cross Discipline - Telescopes and Instrumentation	18	4	8	**30**	3.9%	2.6%	
Other solar system science area	15	7	2	**24**	3.1%	4.3%	4.2%

Table A6: Popularity of sub-fields in planetary research (SE to SK Planetary Science), 2010, 2016 and 2023

Research Area	Count of research interests 2023				Relative popularity of areas in planetary research		
	Permanent Staff	PDRs	Research Students	Total	2023	2016	2010
1 Mercury	12	0	4	**16**	4.2%	6.0%	7.4%
2 Venus	10	6	0	**16**	4.2%	6.6%	9.8%
3 Earth	53	18	27	**98**	25.9%	30.8%	28.5%
4 Mars	30	10	10	**50**	13.2%	18.7%	19.1%
5 Jupiter	31	4	8	**43**	11.3%	15.4%	18.4%
6 Saturn	18	2	1	**21**	5.5%		
7 Uranus	11	1	6	**18**	4.7%		
8 Neptune	9	1	3	**13**	3.4%		
9 Pluto and other trans-Neptunian objects	5	0	1	**6**	1.6%	1.1%	
10 The Moon	15	1	4	**20**	5.3%		
11 Non-Earth solar system moons	17	2	5	**24**	6.3%	4.4%	7.4%
12 Comets and other minor bodies	22	4	4	**30**	7.9%		
13 Other	12	5	7	**24**	6.3%	17.0%	9.4%

Table A7: Popularity of research fields in solid Earth geophysics, 2010, 2016 and 2023

Research Area	Count of research interests 2023				Relative popularity of research areas in geophysics		
	Permanent Staff	PDRs	Research Students	Total	2023	2016	2010
GA Earth Structure	18	2	10	**30**	12.0%	10.9%	11.4%
GB Electromagnetics	6	0	1	**7**	2.8%	2.2%	2.8%
GC Exploration Geophysics	10	3	7	**20**	8.0%	7.7%	6.8%
GD Geodesy and Gravity	12	2	5	**19**	7.6%	2.9%	5.5%
GE Geomagnetism and Palaeomagnetism	9	2	3	**14**	5.6%	5.8%	6.5%
GF Global Change GH Hydrology	3	0	1	**4**	1.6%	1.5%	3.1%
GI Marine Geophysics	5	0	1	**6**	2.4%	5.1%	7.1%
GJ Mathematical Geophysics	8	1	8	**17**	6.8%	7.7%	6.2%
GK Mineral Physics	3	2	2	**7**	2.8%	3.6%	2.8%
GL Oceanography	4	0	2	**6**	2.4%	8.8%	5.2%
GM Physical Properties of Rocks	7	2	1	**10**	4.0%	8.4%	8.6%
GN Physics of the Earth's Interior	18	4	10	**32**	12.9%	8.0%	8.0%
GN Seismology	24	2	13	**39**	15.7%	11.3%	11.1%
GO Tectonophysics	15	1	6	**22**	8.8%	9.9%	10.2%
GP Site testing	3	0	0	**3**	1.2%	0.7%	0.6%
Other solid Earth geophysics area	12	0	1	**13**	5.2%	5.5%	4.3%

Table A8: Popularity of other broad research areas, 2010, 2016 and 2023

Research Area	Count of research interests 2023				Relative popularity of all research areas		
	Permanent Staff	PDRs	Research Students	Total	2023	2016	2010
XA Theoretical Astrophysics	31	10	15	**56**	2.1%	2.5%	2.2%
XB Theoretical Solar System work	5	1	1	**7**	0.3%	0.4%	0.4%
XC Theoretical Geophysics	2	0	1	**3**	0.1%	0.4%	0.2%
Y Instruments and Techniques	32	17	13	**62**	2.3%	2.0%	3.2%
Z Spacecraft	21	4	8	**33**	1.2%	0.7%	1.1%
+ Other - please specify	25	0	0	**25**	0.9%	0.5%	0.4%

A1 Research interests of all personnel

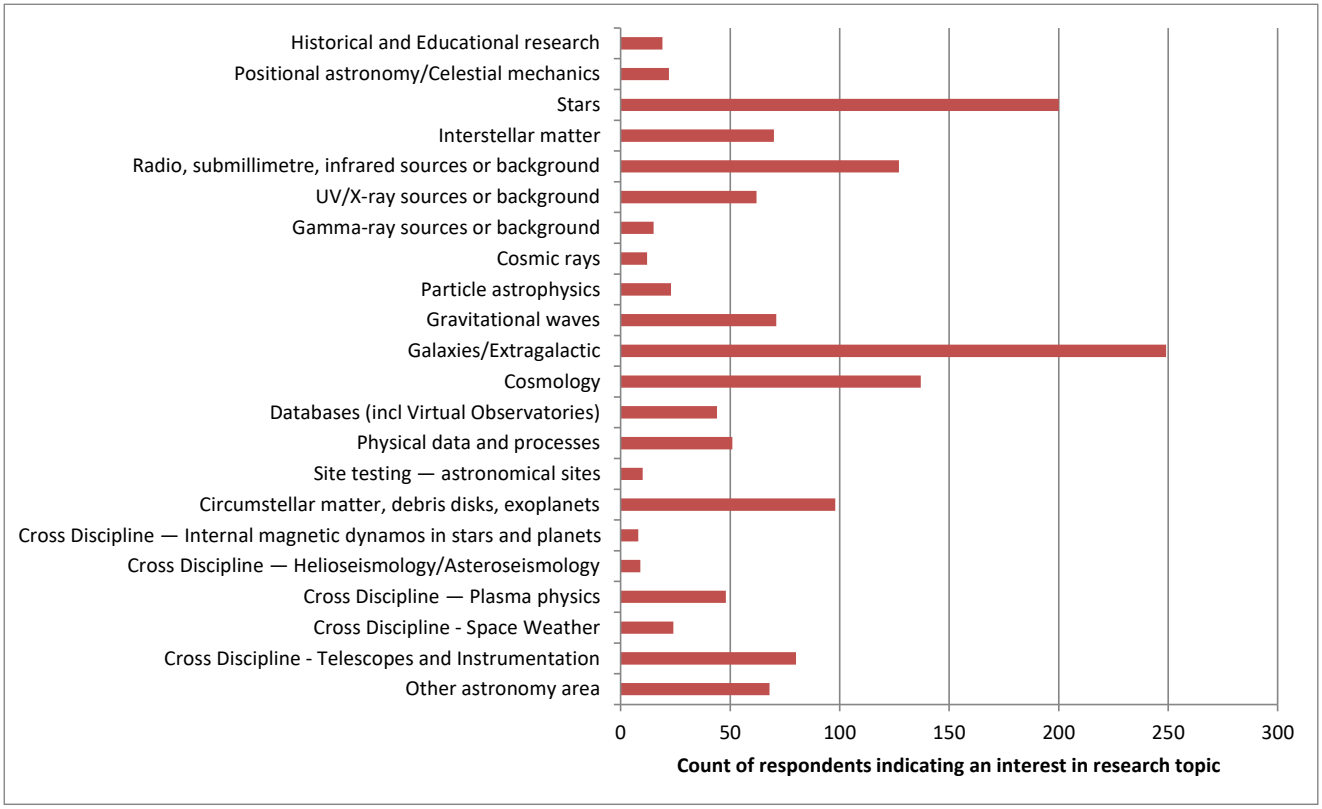

Figure A1: Breakdown of interests in Astronomy research, 2023

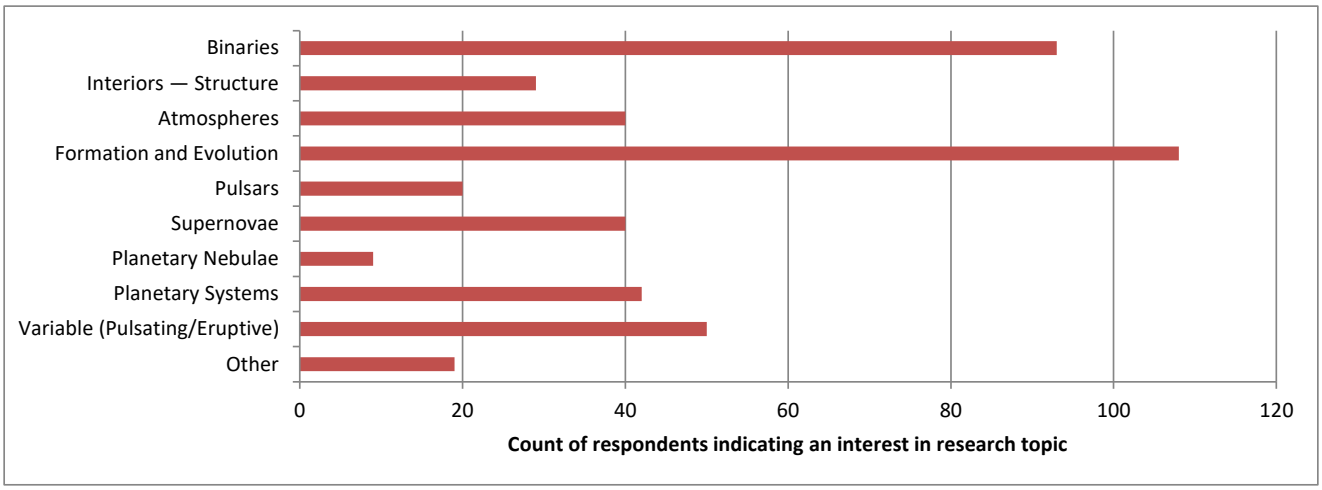

Figure A2: Breakdown of interests in stellar research, 2023

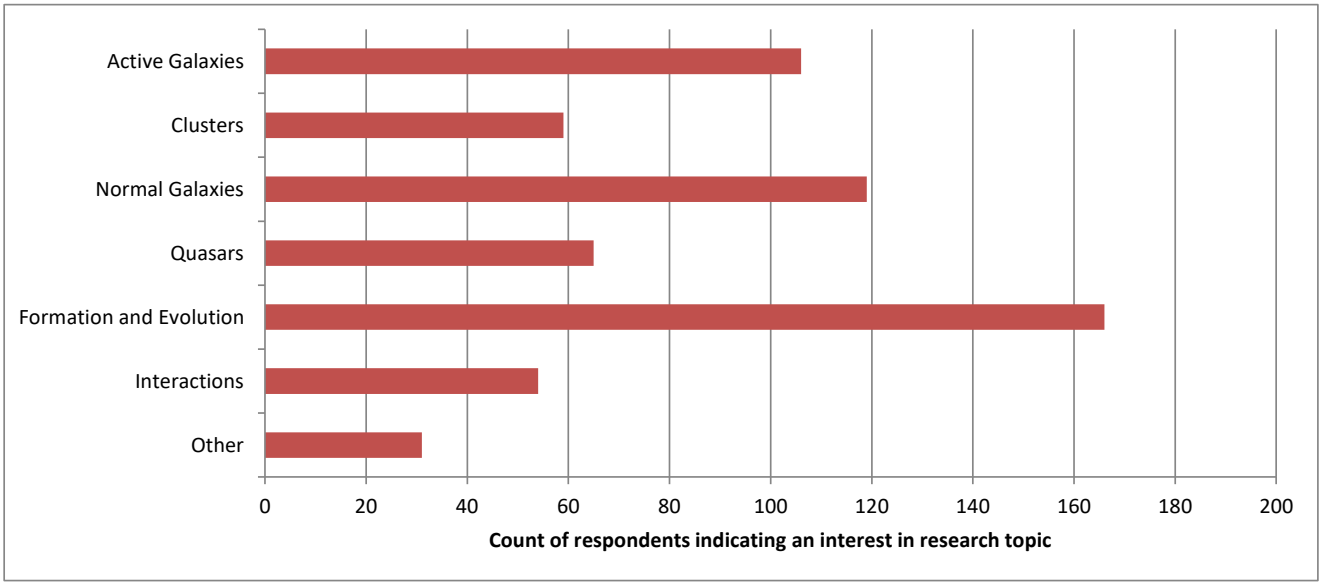

Figure A3: Breakdown of interests in extragalactic research, 2023

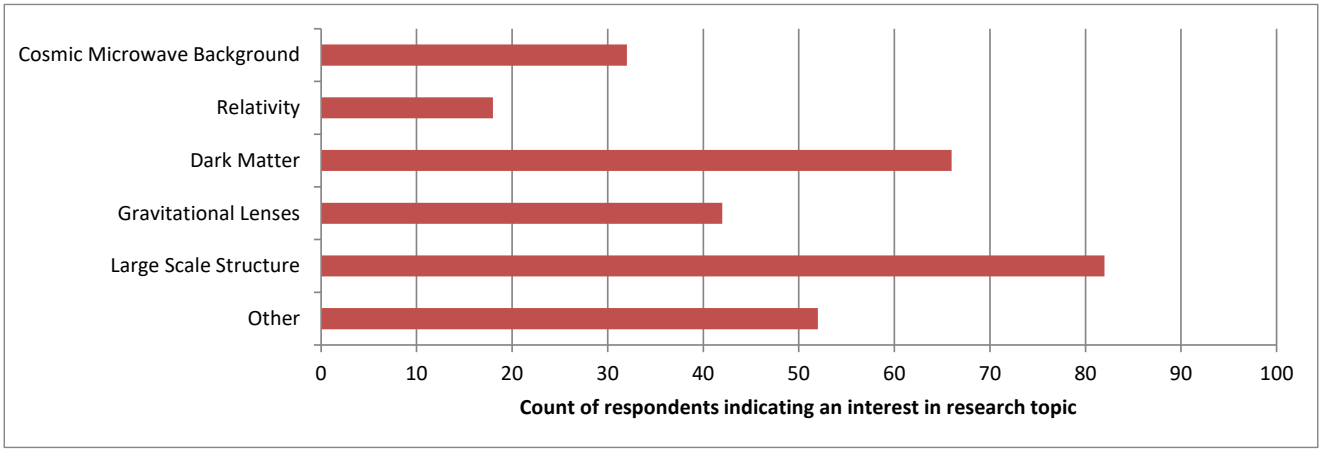

Figure A4: Breakdown of interests in cosmology research, 2023

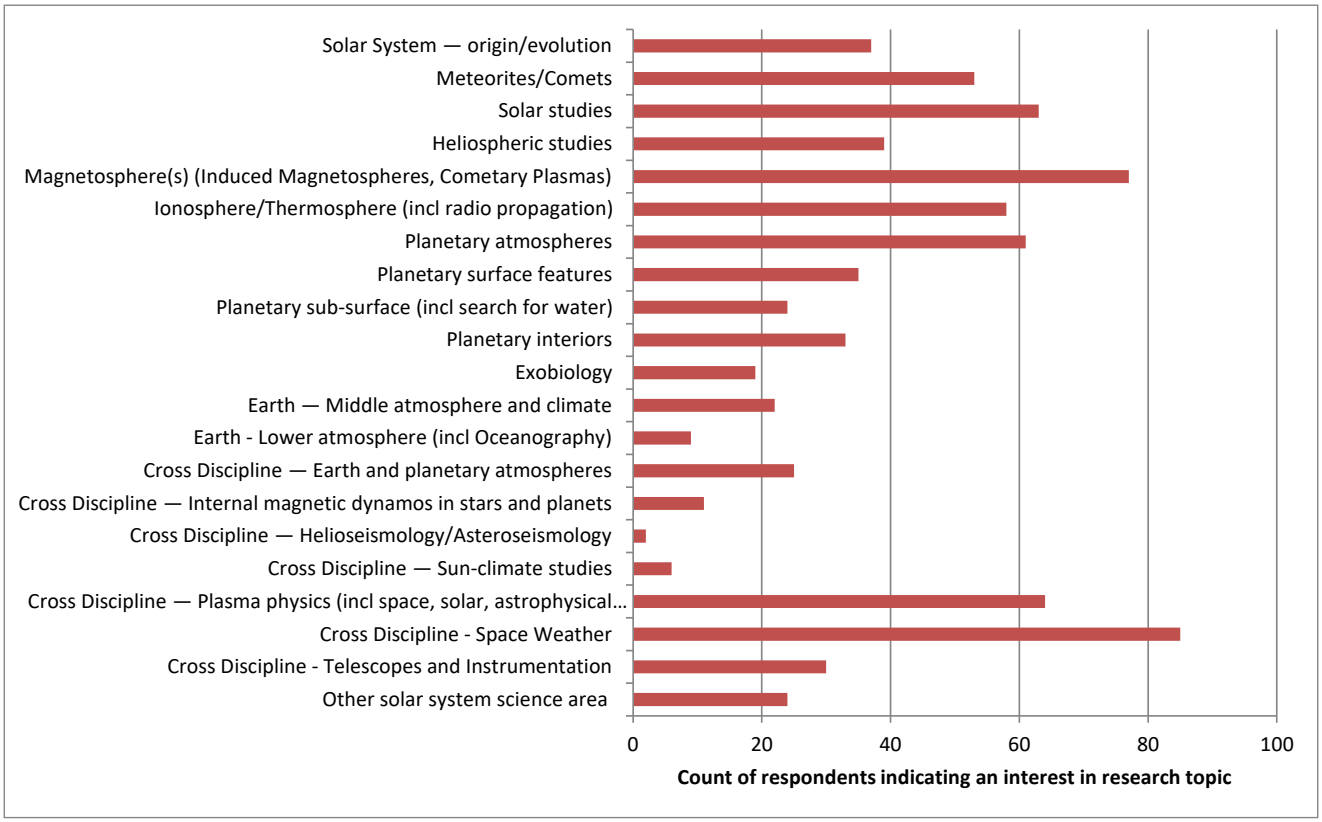

Figure A5: Breakdown of interests in solar system science, 2023

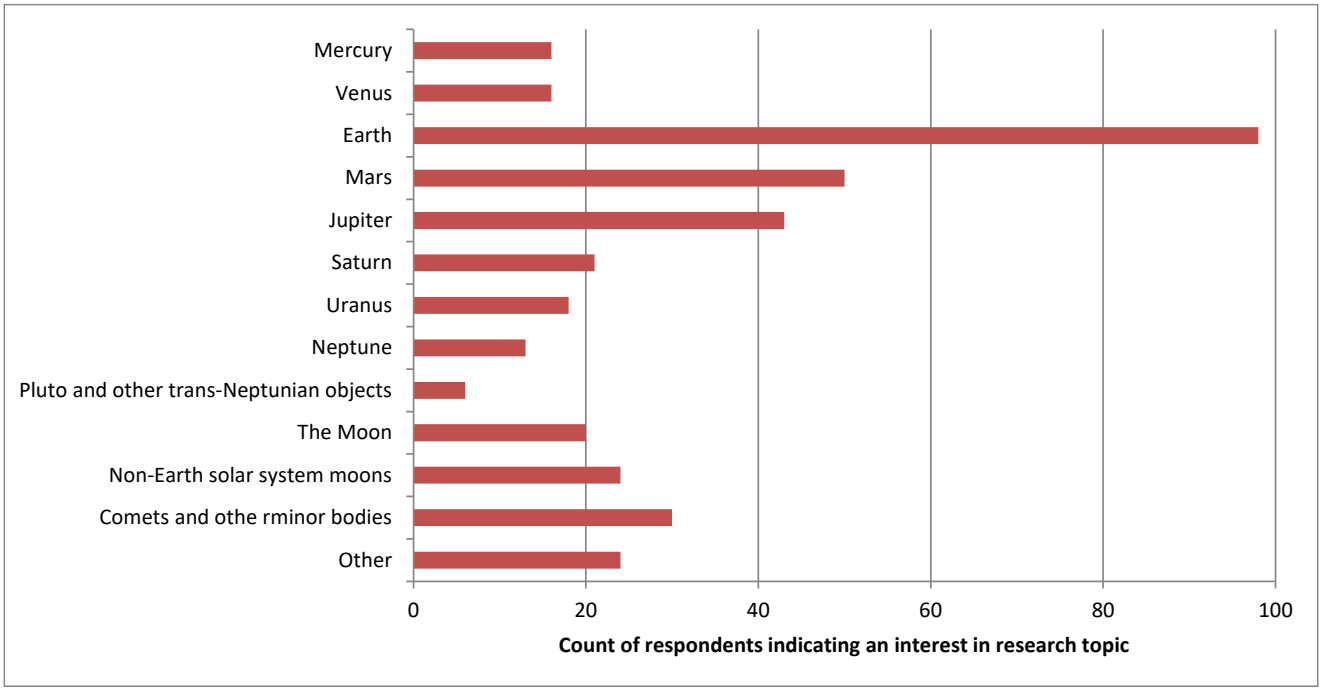

Figure A6: Breakdown of interests in planetary research, 2023

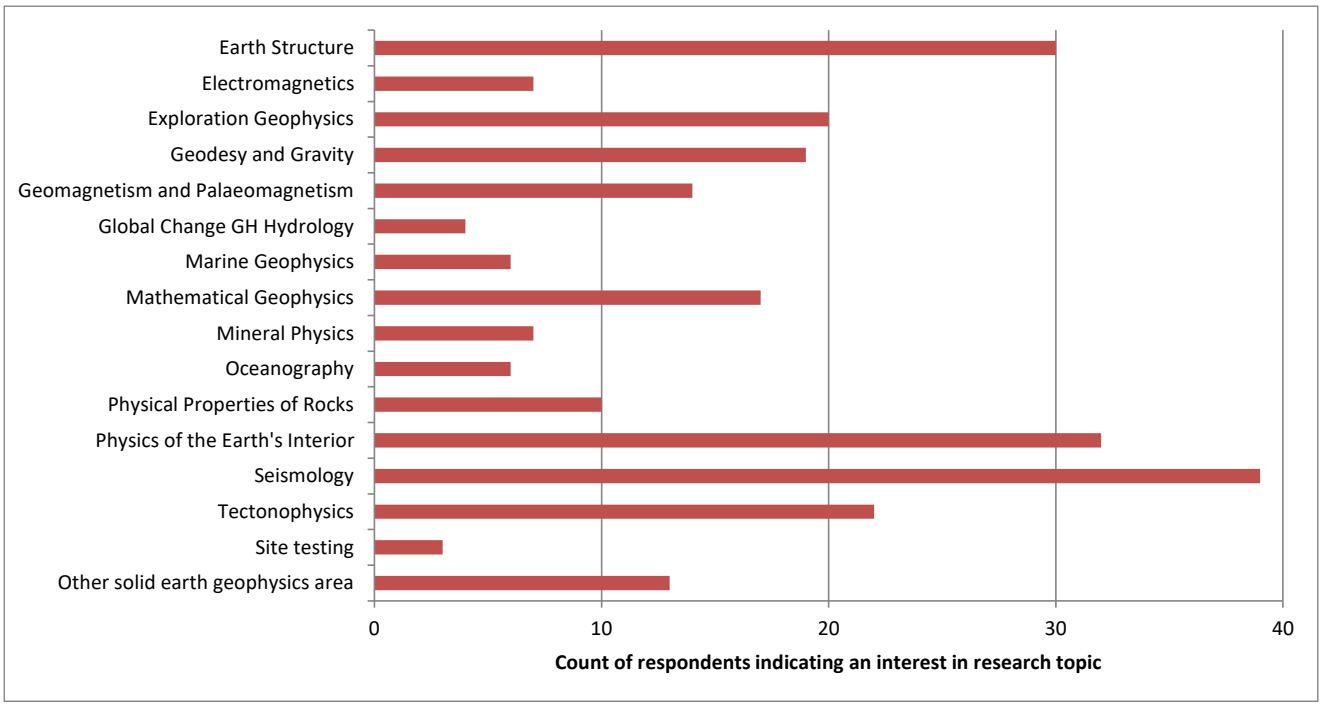

Figure A7: Breakdown of interests in solid Earth geophysics research, 2023

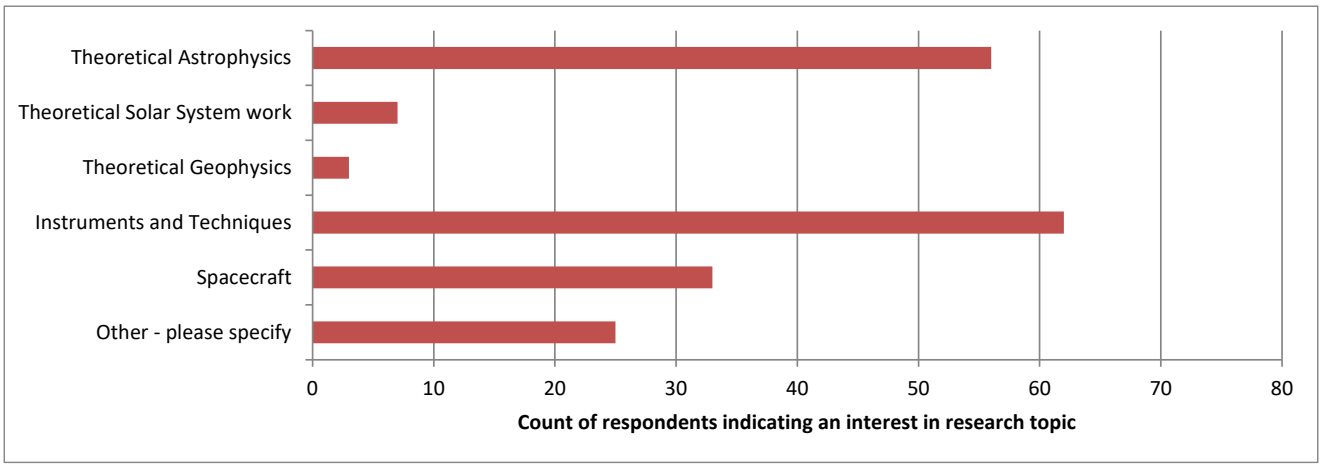

Figure A8: Breakdown of interest in other broad research areas, 2023

A2 Research interests of permanent staff

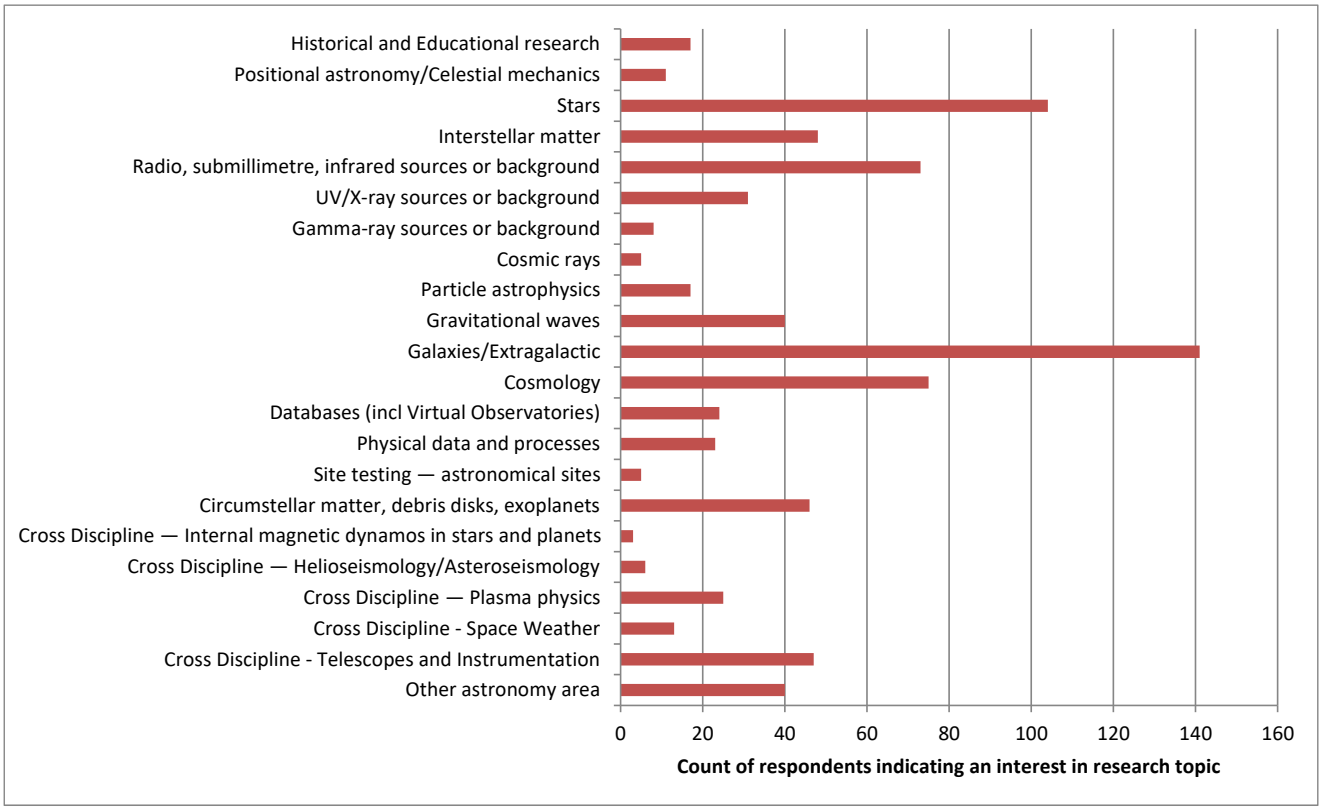

Figure A9: Breakdown of the interests of permanent staff in astronomy research, 2023

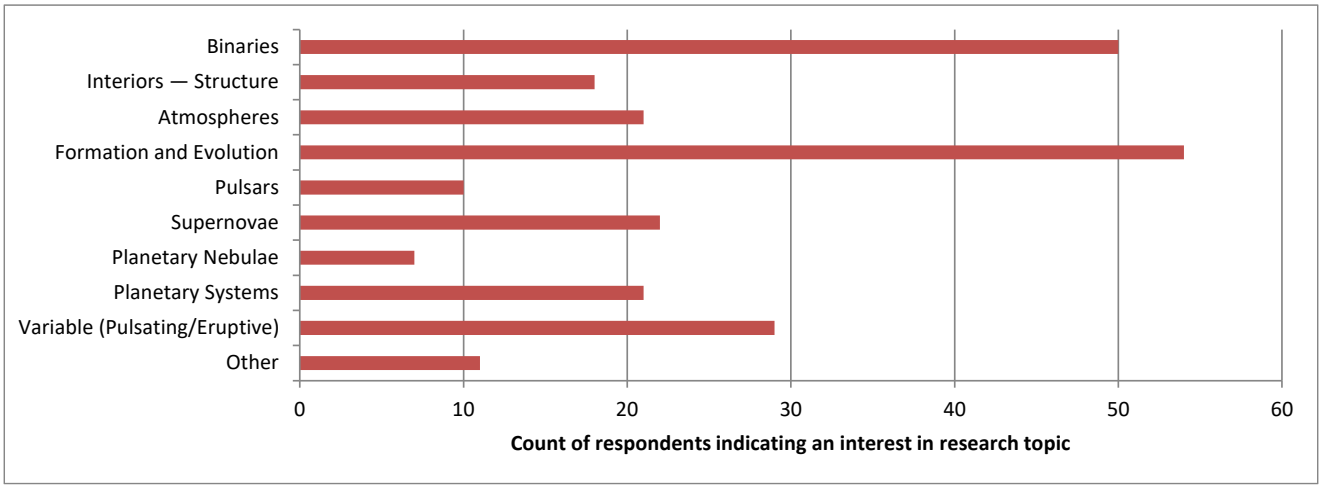

Figure A10: Breakdown of the interests of permanent staff in stellar research, 2023

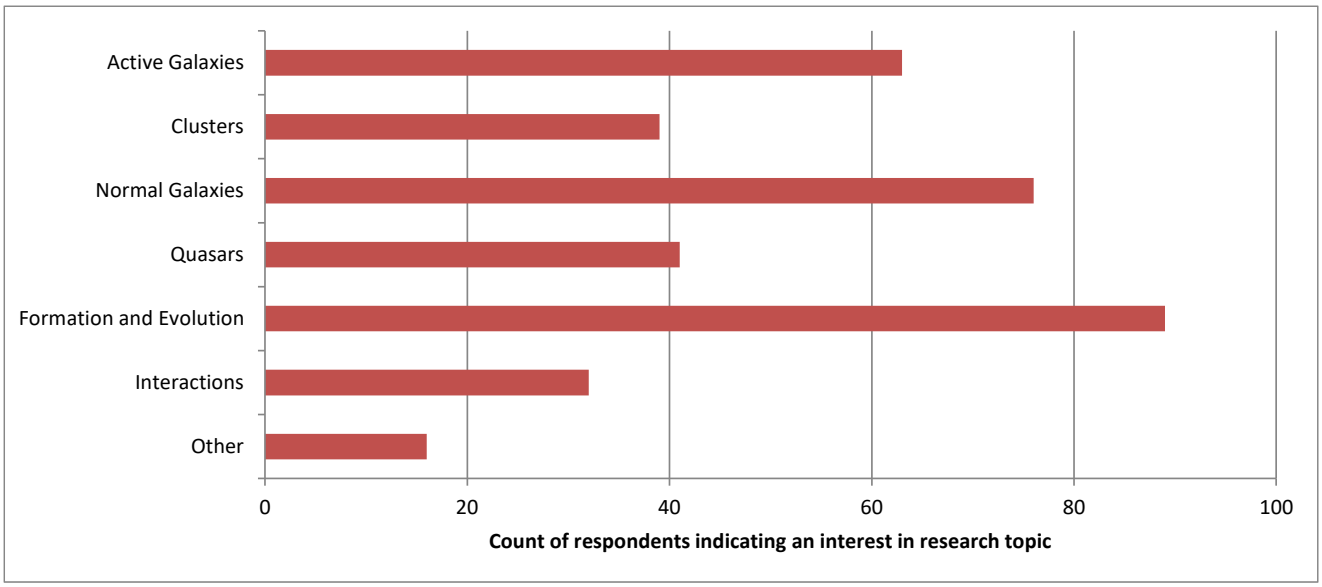

Figure A11: Breakdown of the interests of permanent staff in extragalactic research, 2023

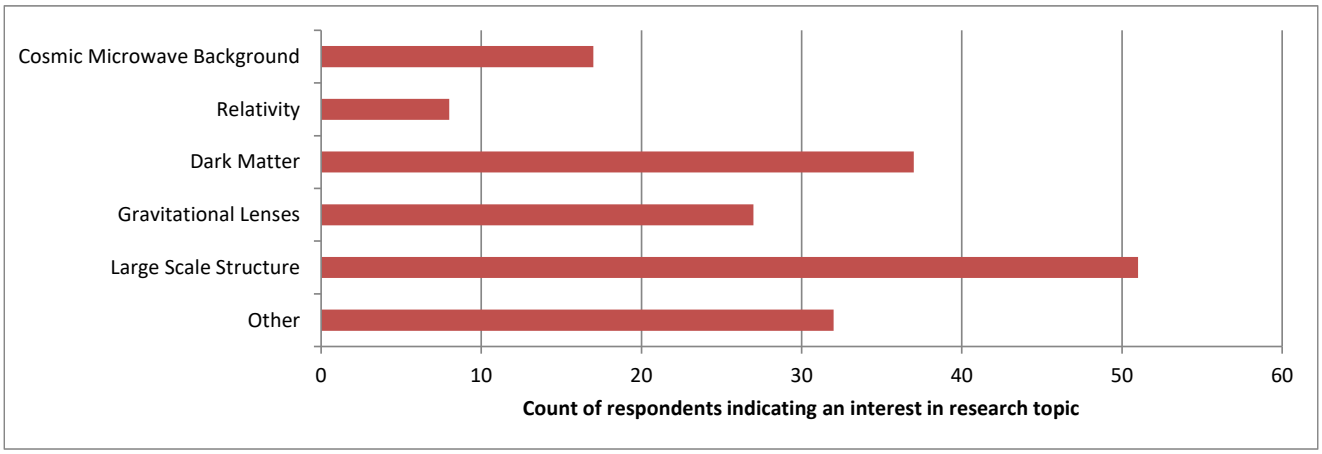

Figure A12: Breakdown of the interests of permanent staff in cosmology research, 2023

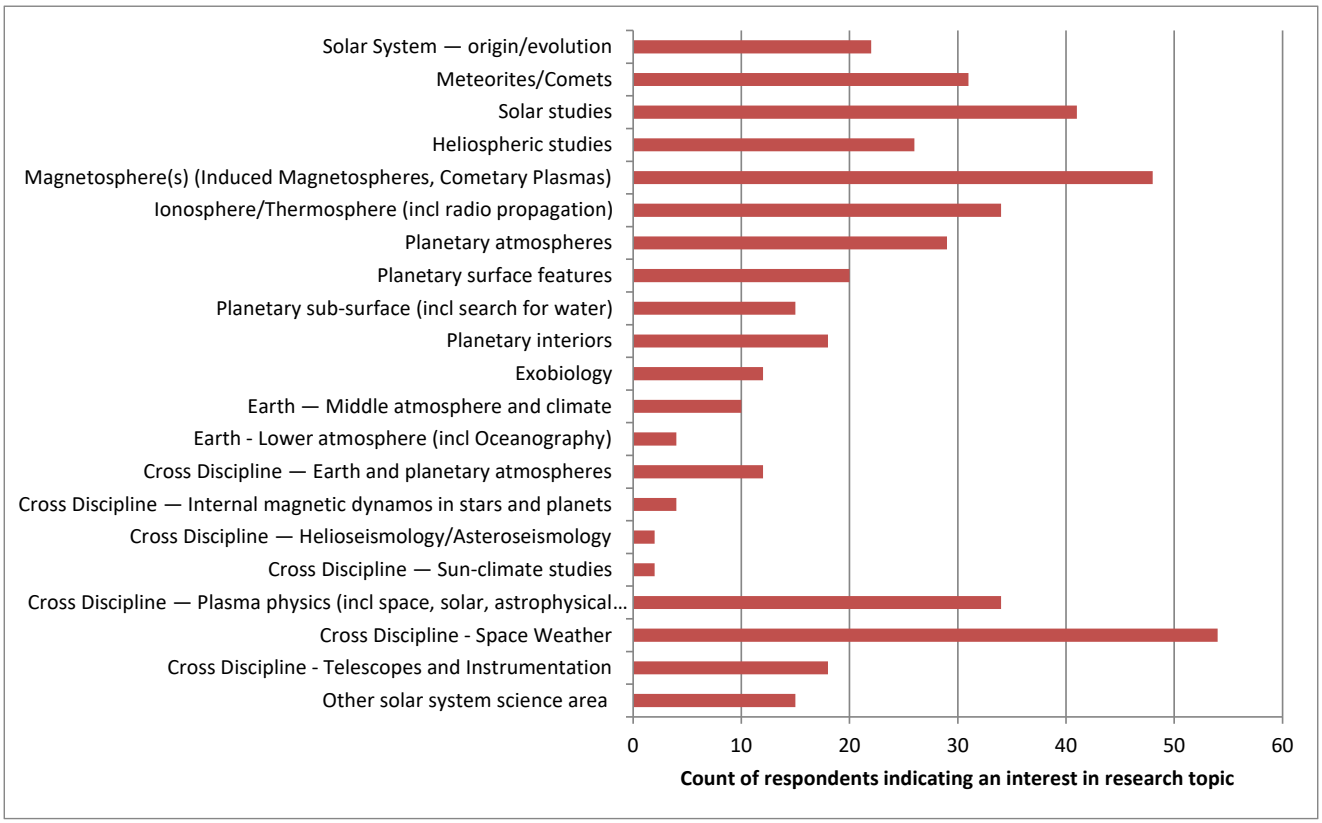

Figure A13: Breakdown of the interests of permanent staff in solar system science, 2023

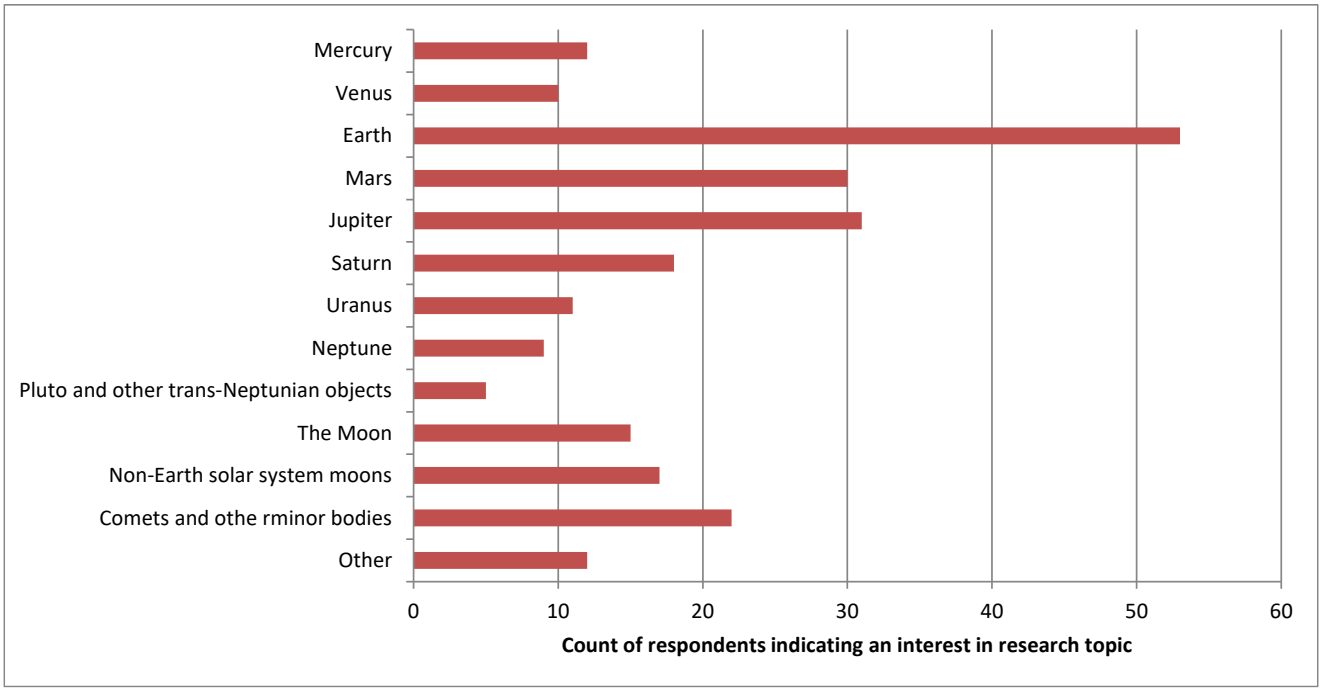

Figure A14: Breakdown of the interests of permanent staff in planetary research, 2023

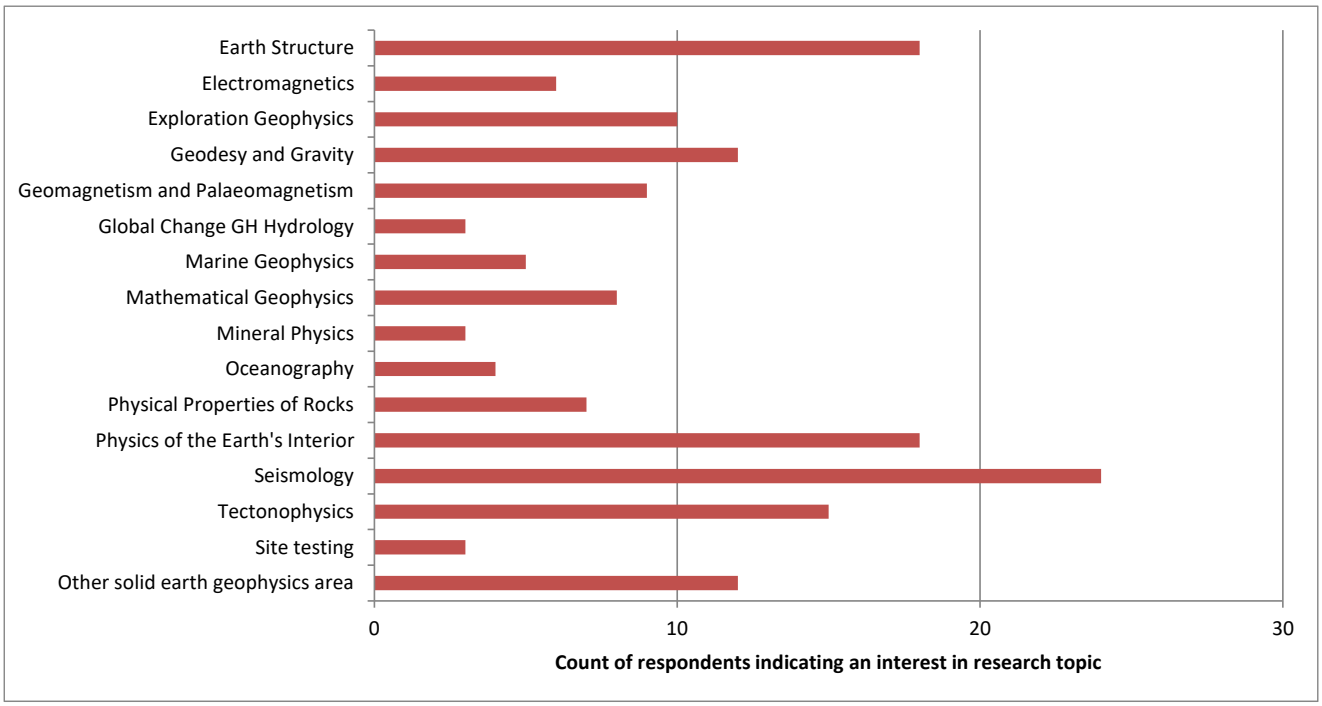

Figure A15: Breakdown of the interests of permanent staff in solid Earth geophysics research, 2023

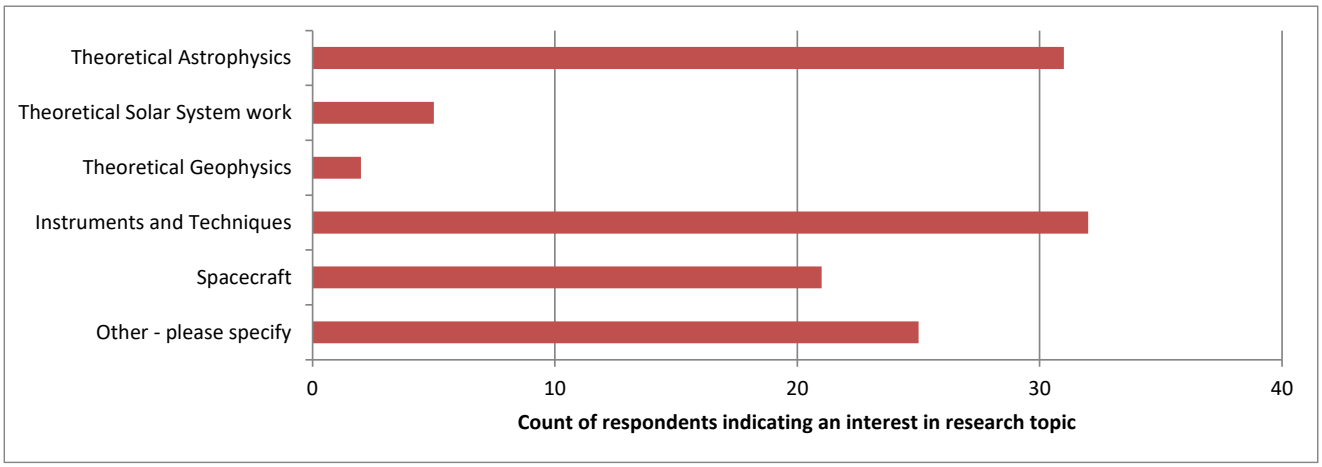

Figure A16: Breakdown of the interests of permanent staff in other broad research areas, 2023

A3 Research interests of postdoctoral research associates

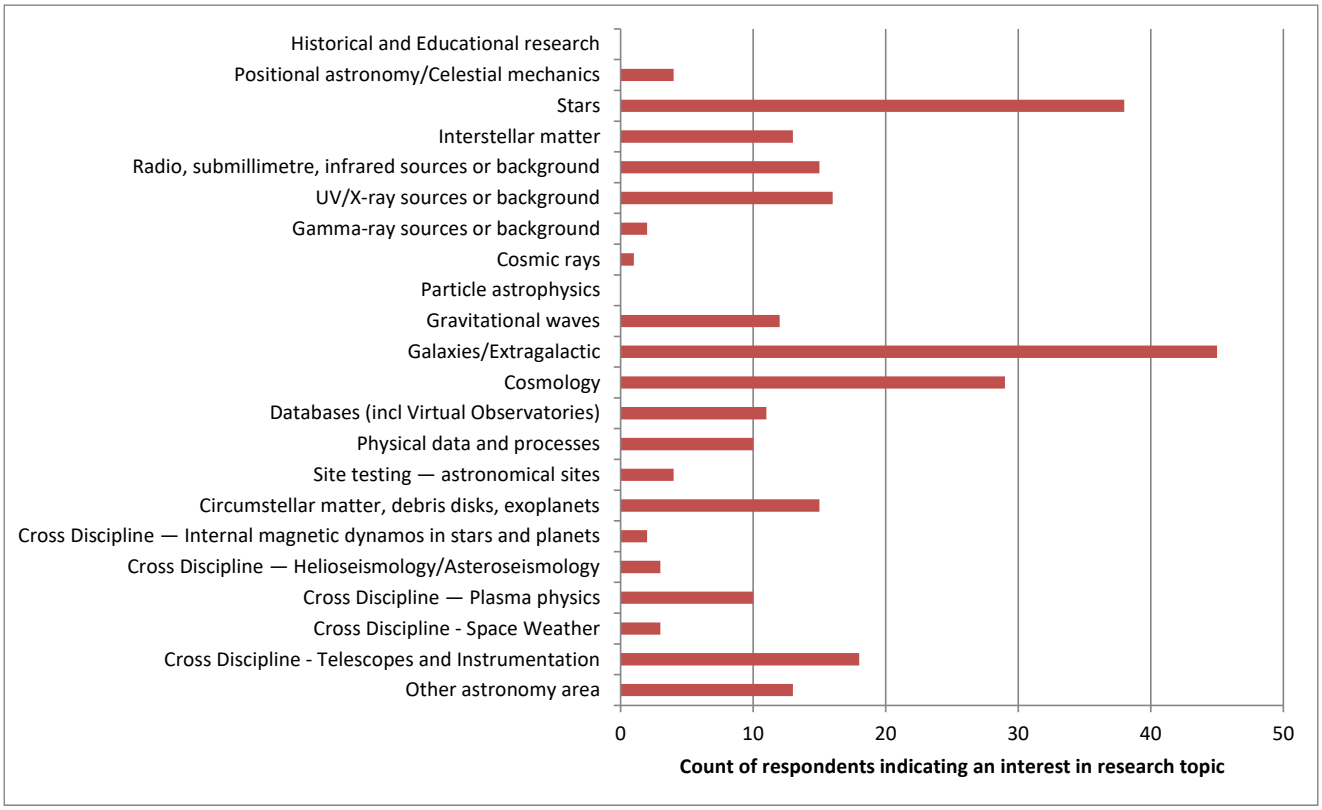

Figure A17: Breakdown of the interests of postdoctoral research associates in astronomy research, 2023

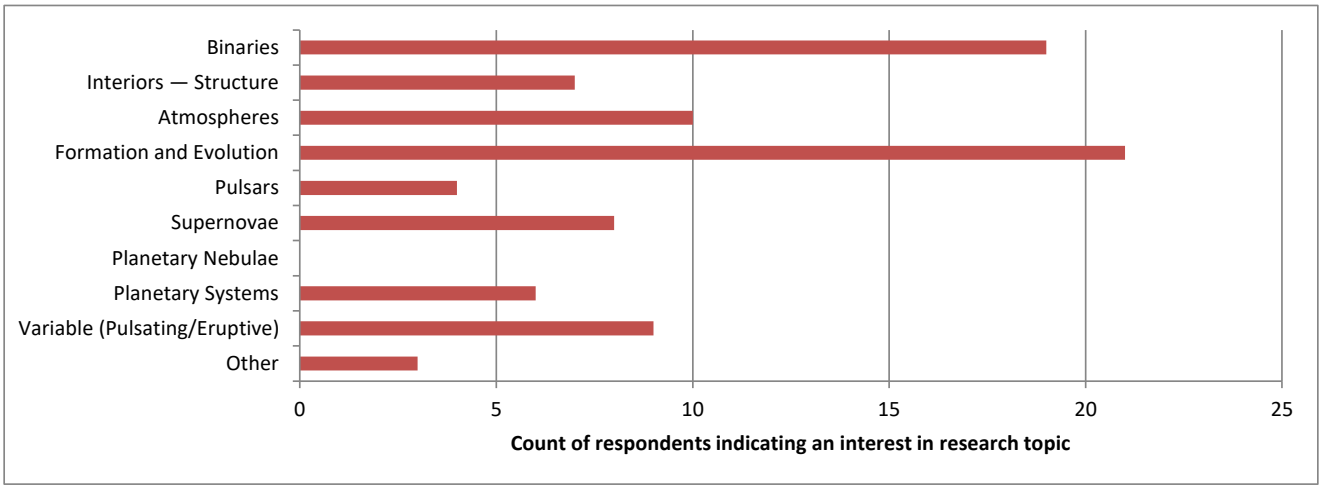

Figure A18: Breakdown of the interests of postdoctoral research associates in stellar research, 2023

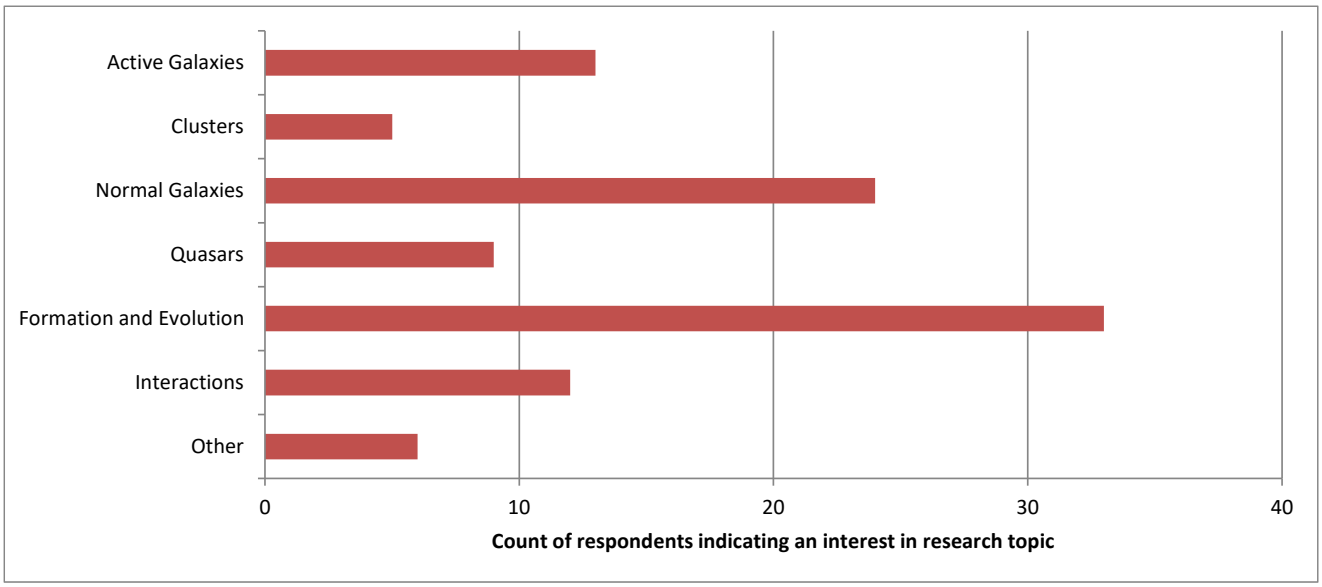

Figure A19: Breakdown of the interests of postdoctoral research associates in extragalactic research, 2023

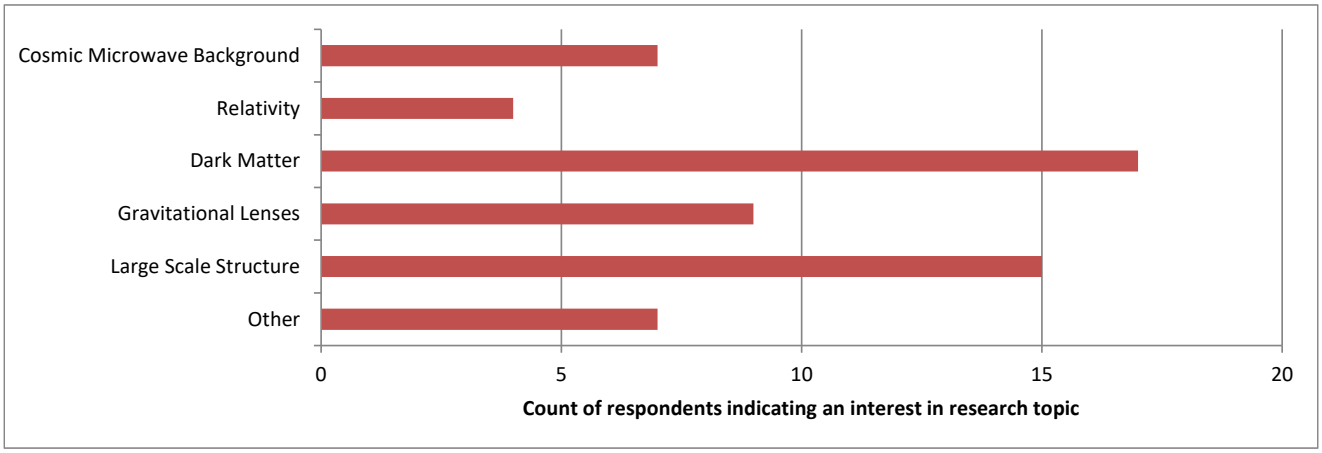

Figure A20: Breakdown of the interests of postdoctoral research associates in cosmology research, 2023

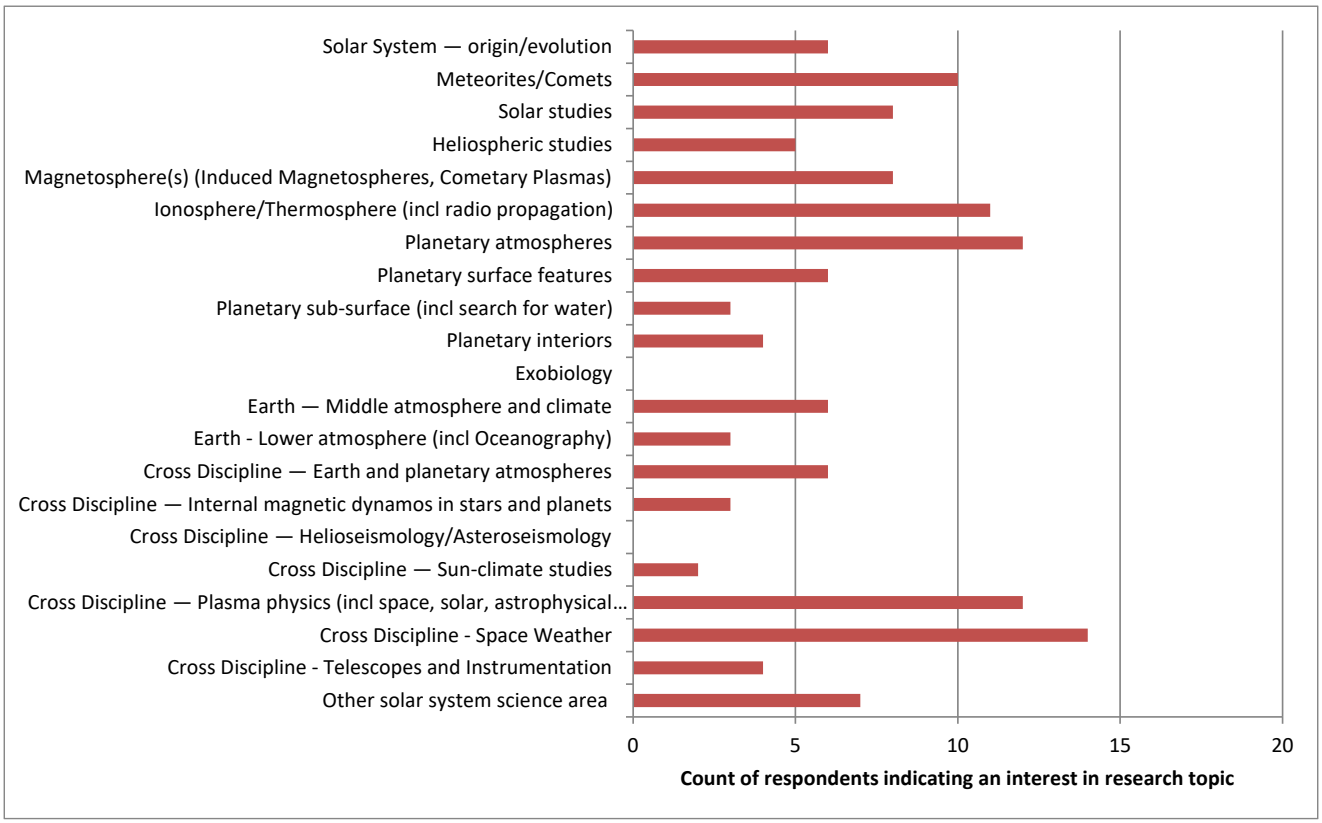

Figure A21: Breakdown of the interests of postdoctoral research associates in solar system science, 2023

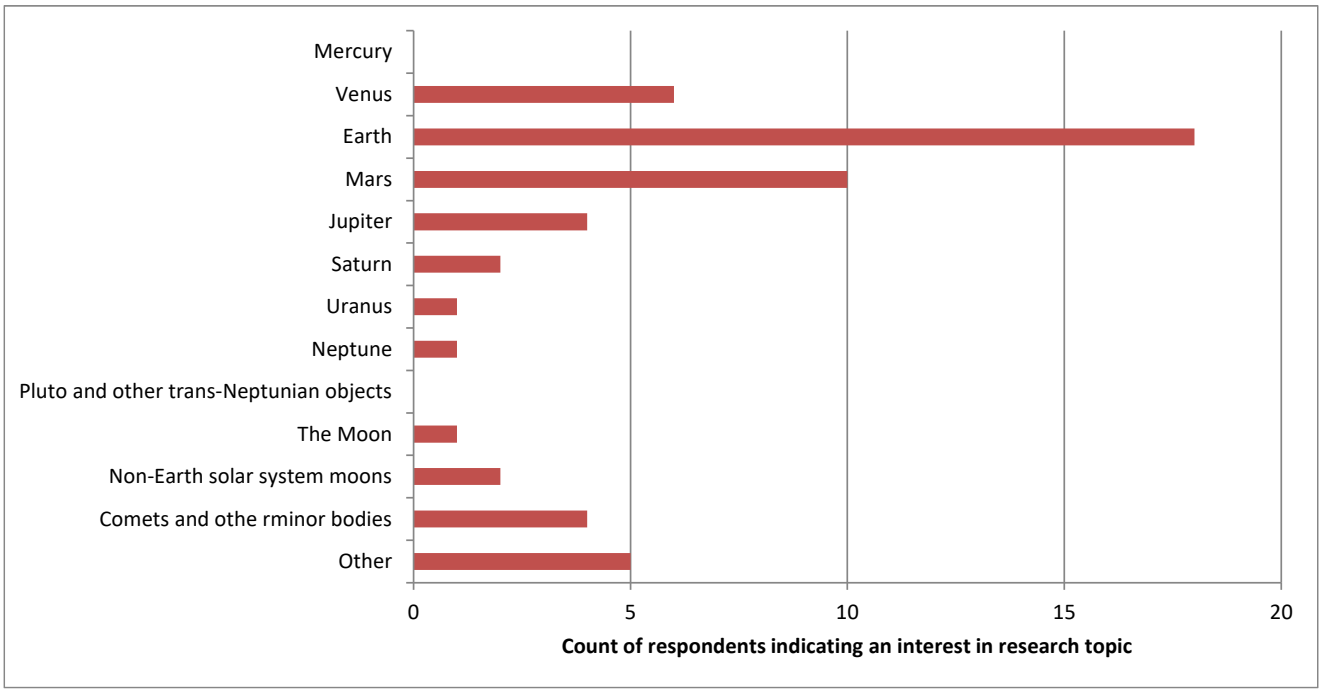

Figure A22: Breakdown of the interests of postdoctoral research associates in planetary research, 2023

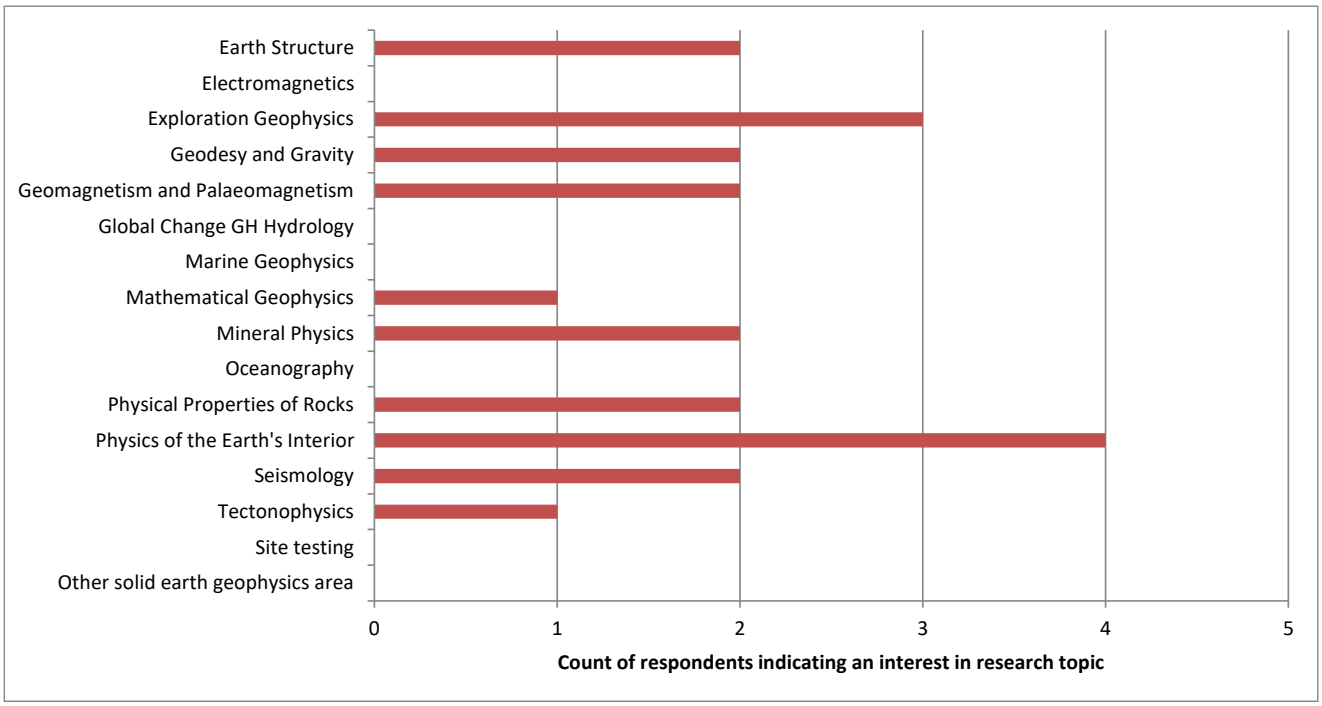

Figure A23: Breakdown of the interests of postdoctoral research associates in solid Earth geophysics research, 2023

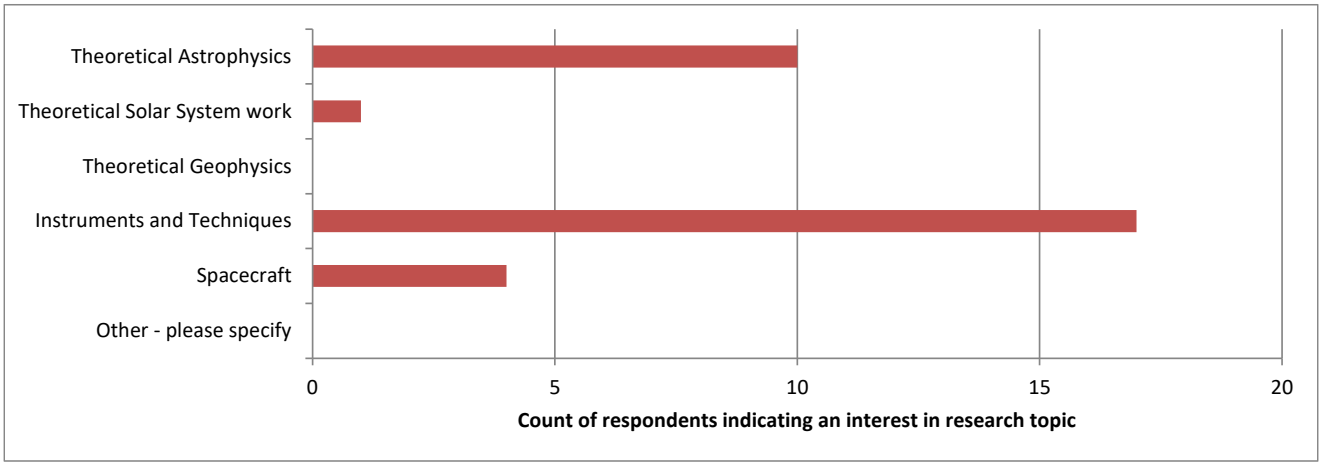

Figure A24: Breakdown of the interests of postdoctoral research associates in other broad research areas, 2023

A3 Research interests of Postgraduate Students

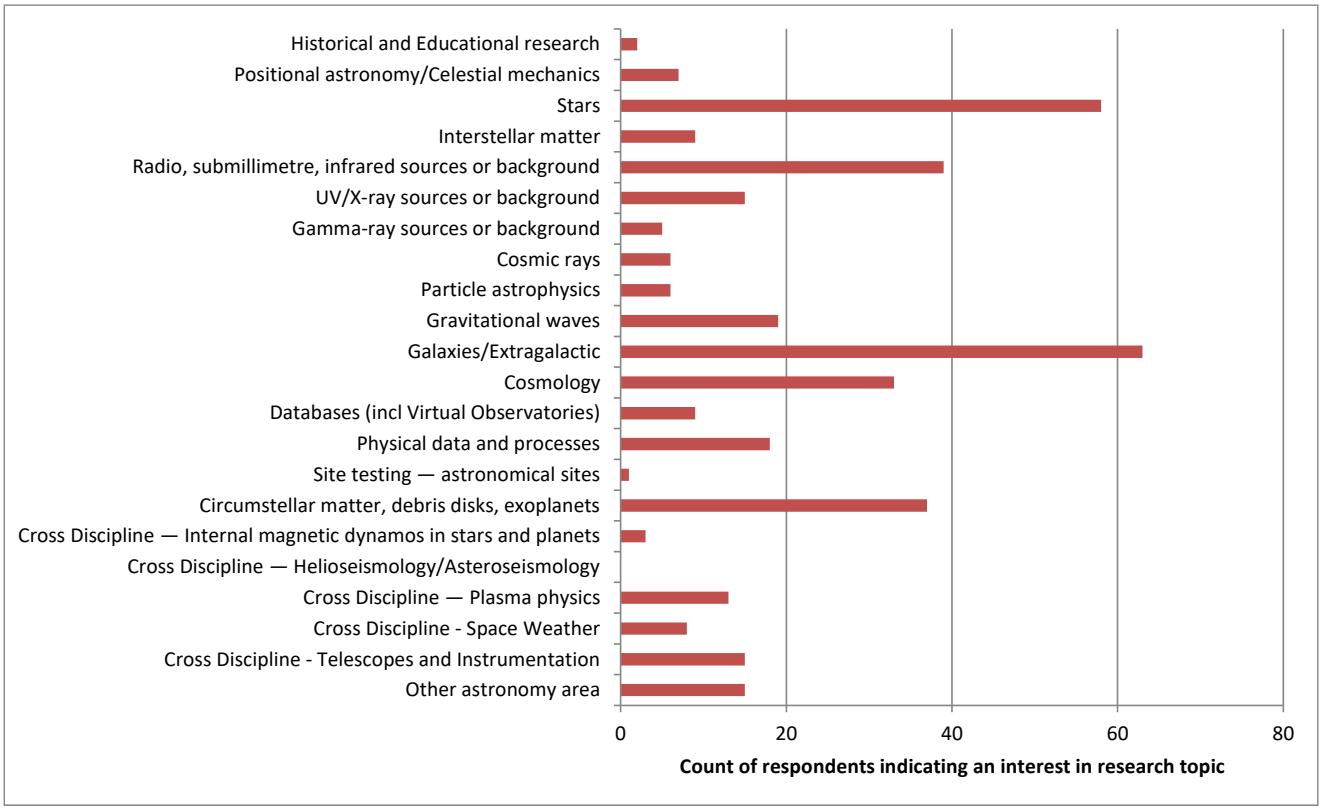

Figure A25: Breakdown of the interests of postgraduate students in astronomy research, 2023

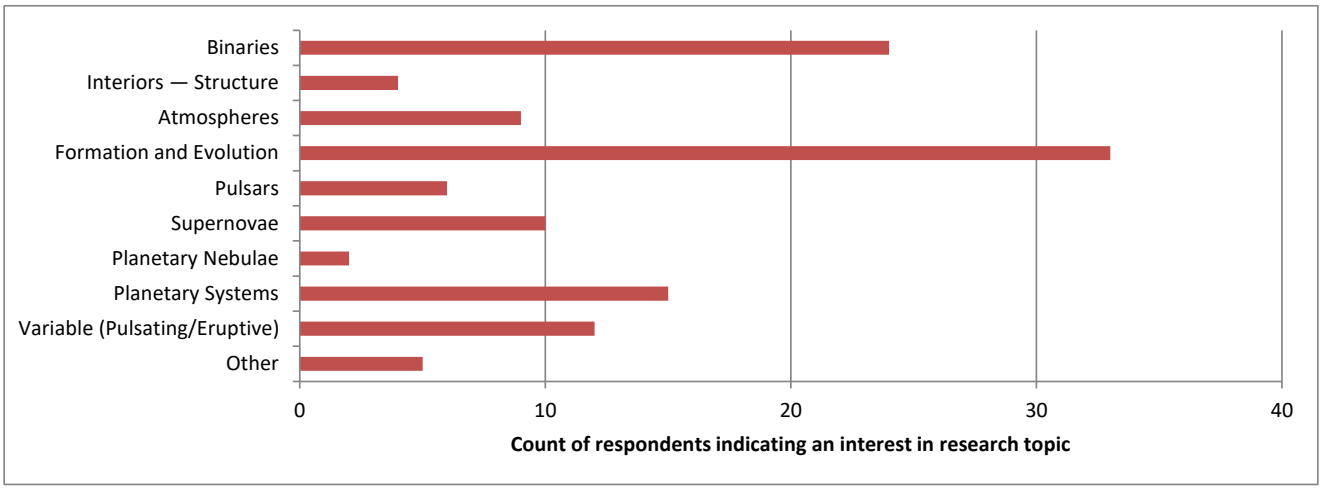

Figure A26: Breakdown of the interests of postgraduate students in stellar research, 2023

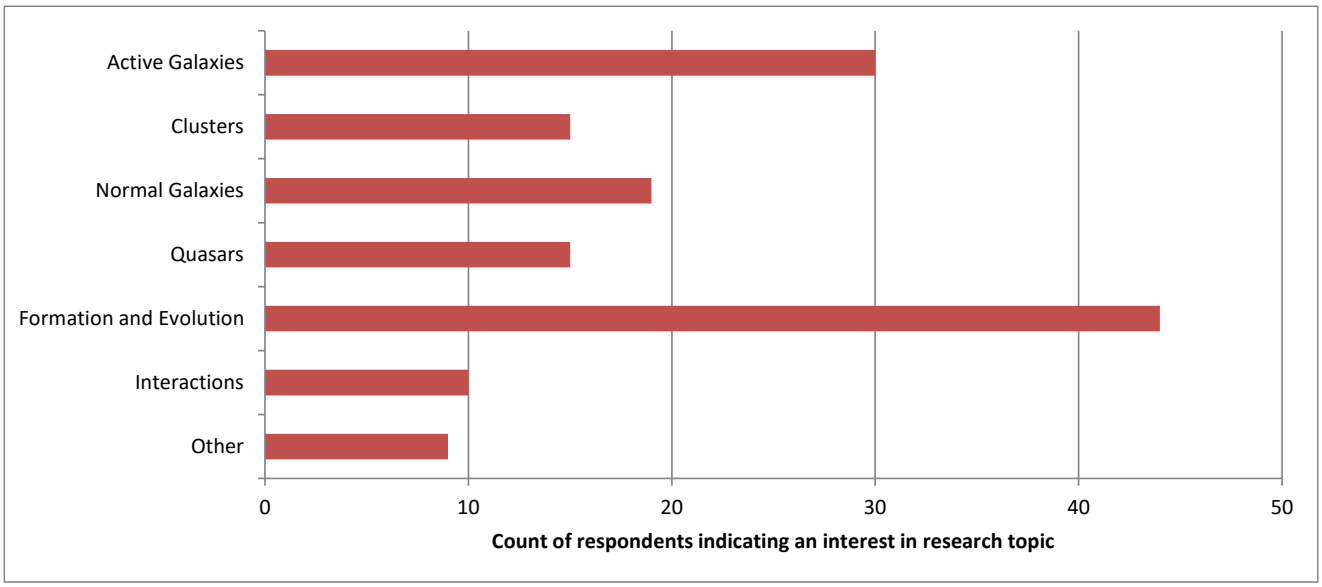

Figure A27: Breakdown of the interests of postgraduate students in extragalactic research, 2023

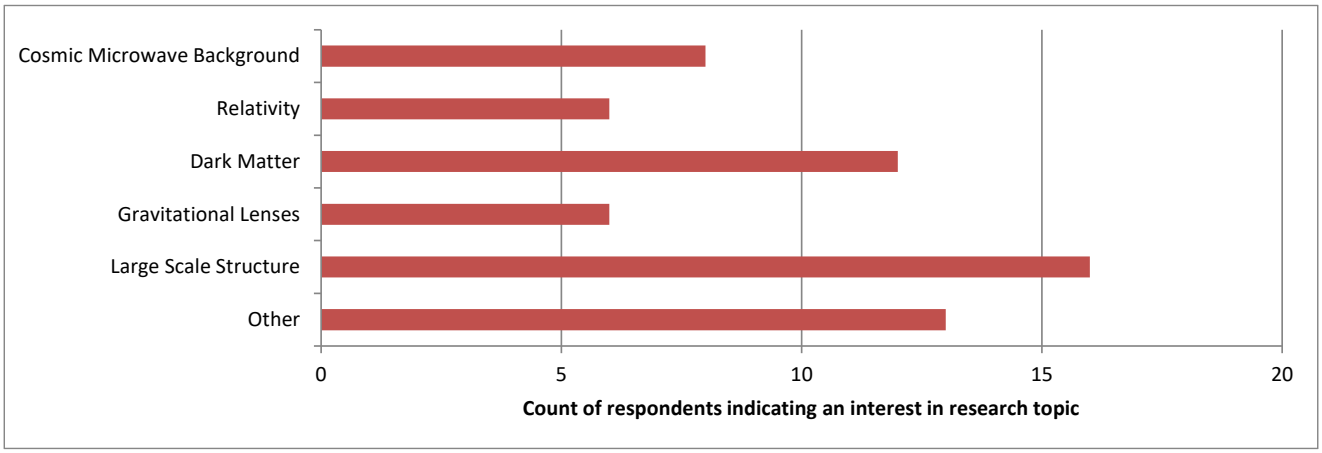

Figure A28: Breakdown of the interests of postgraduate students in cosmology research, 2023

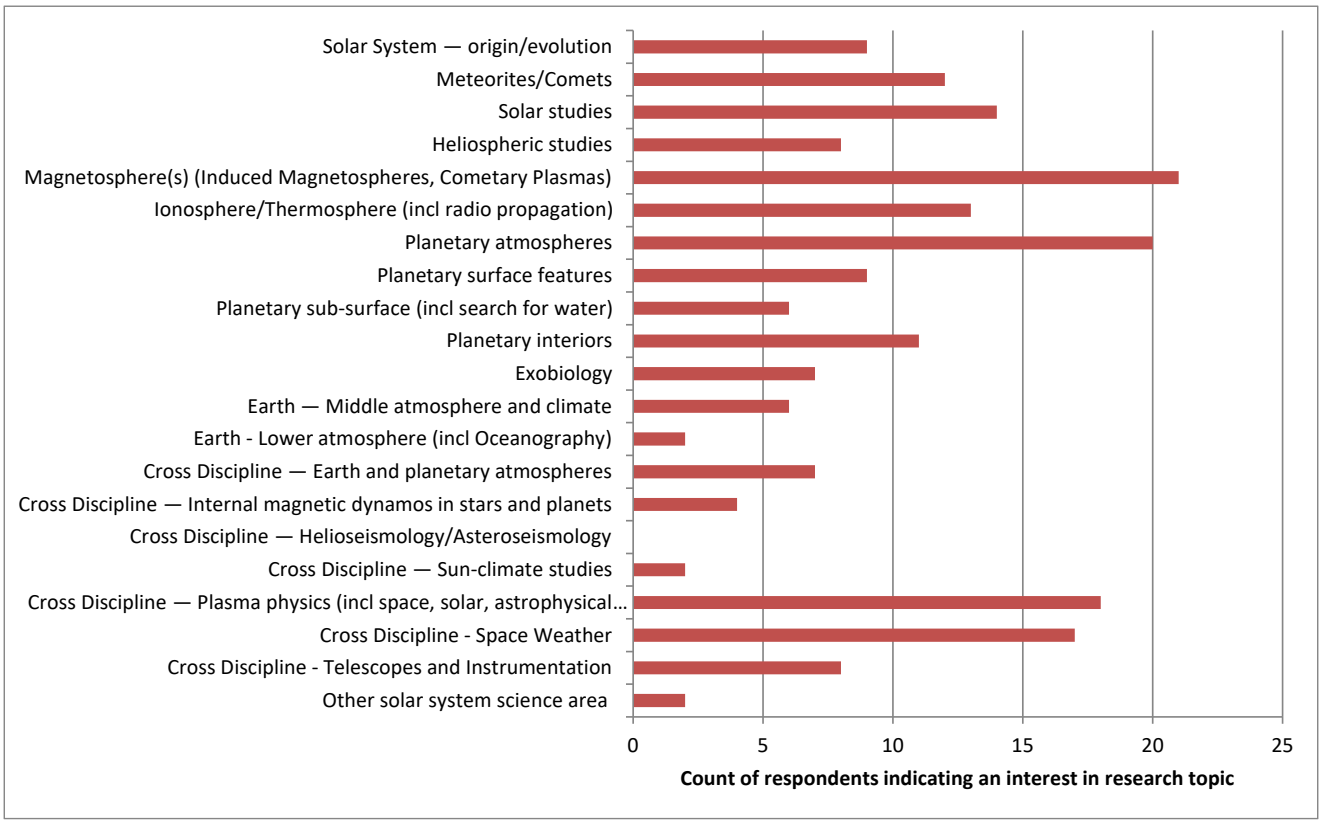

Figure A29: Breakdown of the interests of postgraduate students in solar system science, 2023

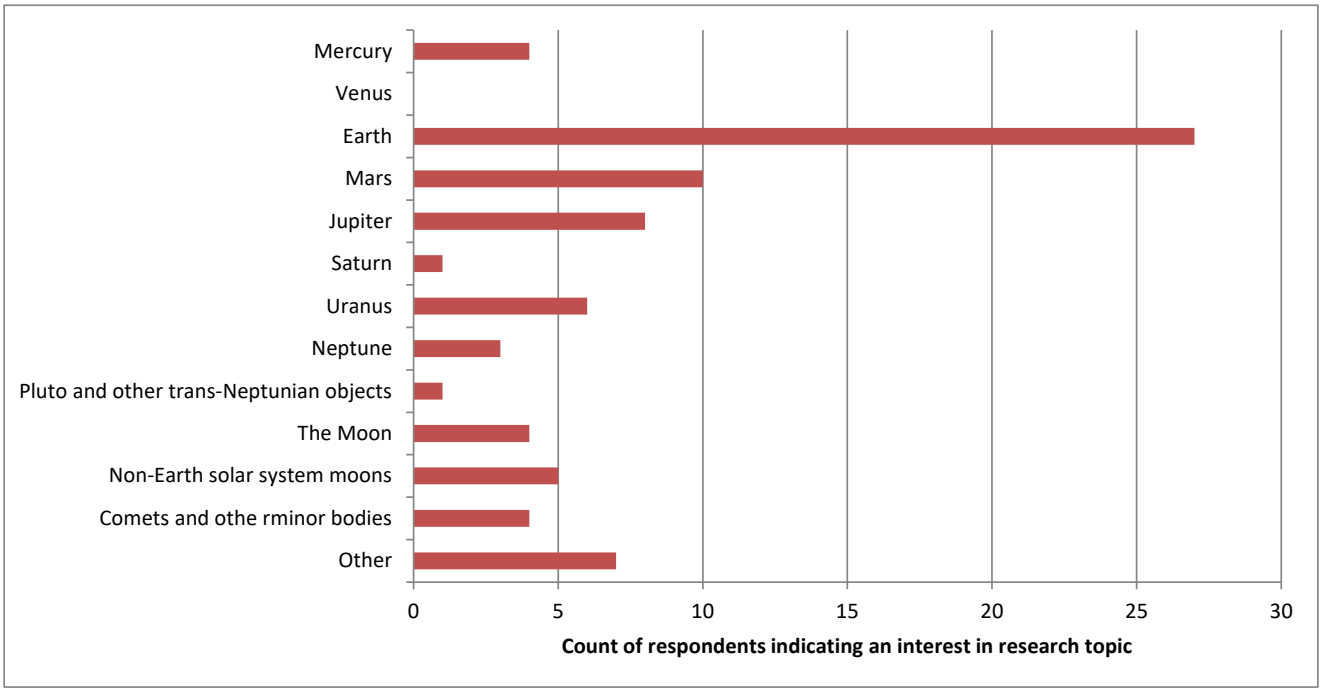

Figure A30: Breakdown of the interests of postgraduate students in planetary research, 2023

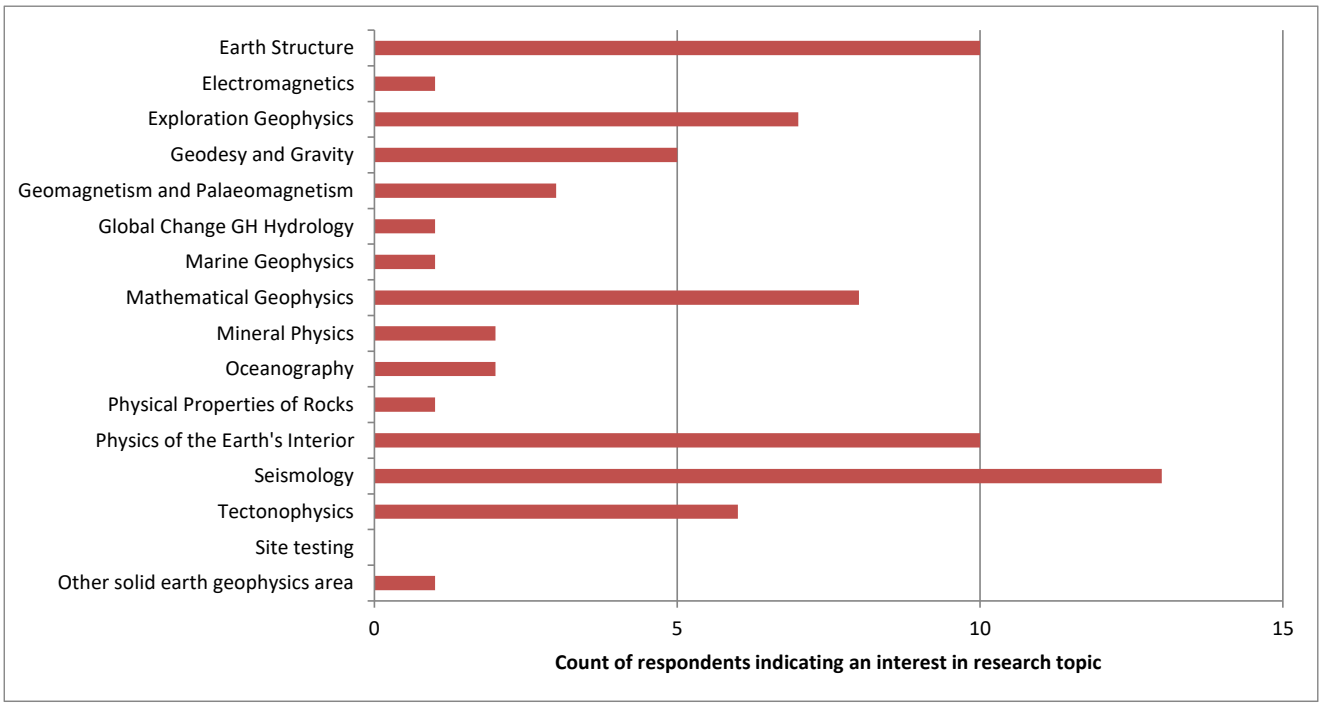

Figure A31: Breakdown of the interests of postgraduate students in solid Earth geophysics research, 2023

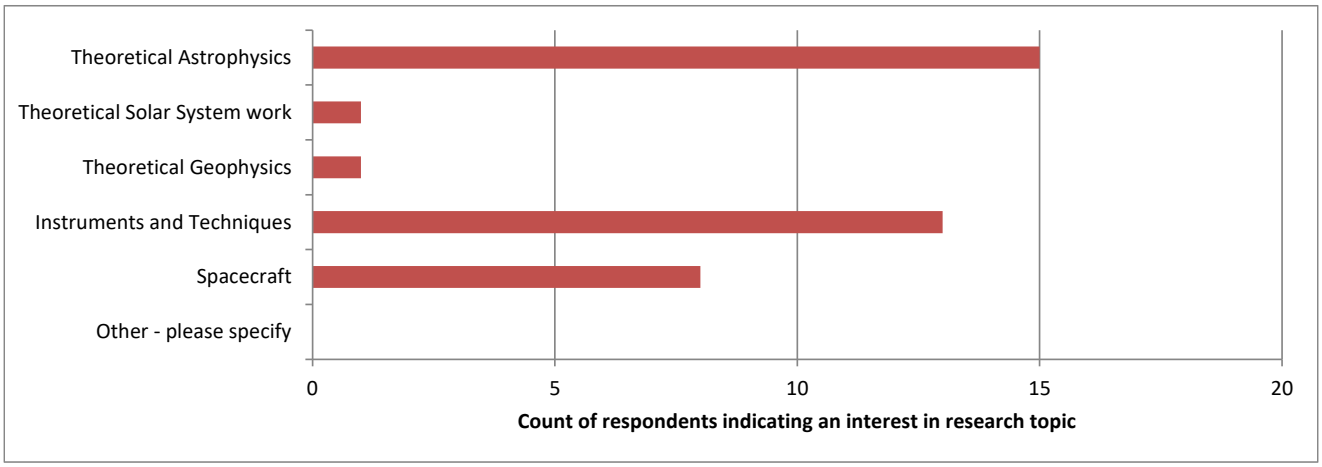

Figure A32: Breakdown of the interests of postgraduate students in other broad research areas, 2023

Appendix B: Departments and Research Establishments that participated

Data from the following university department and research groups was used for the 2023 study. Departments marked with an asterisk did not respond to the survey: information was collected from the departments' websites:

University of Aberdeen, School of Geosciences*
Aberystwyth University, Institute of Geography and Earth Sciences*
Aberystwyth University, Department of Physics*
University of Bath, Department of Electronic and Electrical Engineering*
University of Bath, Department of Physics*
University of Birmingham, School of Geography, Earth and Environmental Sciences*
University of Birmingham, School of Physics and Astronomy*
University of Bristol, School of Earth Sciences*
University of Bristol, School of Physics*
University of Cambridge, Department of Applied Mathematics and Theoretical Physics (DAMTP)*
University of Cambridge, Department of Physics*
University of Cambridge, Institute of Astronomy
University of Cambridge, Department of Earth Science*
Cardiff University, School of Earth and Environmental Sciences
Cardiff University, School of Physics and Astronomy
University of Central Lancashire, Jeremiah Horrocks Institute
University of Dundee, Space Technology Centre*
University of Dundee, School of Science & Engineering, Division of Mathematics*
University of Dundee, School of Science & Engineering, Division of Physics*
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*
University of Edinburgh, School of Mathematics
Exeter University, Department of Physics and Astronomy
Exeter University, Department of Mathematics*
University of Glasgow, School of Mathematics and Statistics
University of Glasgow, School of Physics and Astronomy
University of Glasgow, School of Geographical and Earth Sciences*
University of Hertfordshire, School of Physics, Astronomy and Mathematics
Heriot-Watt University, School of Energy, Geoscience, Infrastructure and Society*
University of Hull, Department of Physics and Astrophysics*
Imperial College London, Department of Earth Sciences*
Imperial College London, Department of Electrical and Electronic Engineering*
Imperial College London, Department of Physics
Keele University, School of Geography, Geology and the Environment
Keele University, School of Physics and Astrophysics*

University of Kent, School of Physical Sciences*
Kings College London, Department of Physics
Lancaster University, Department of Physics*
The Lancaster Environment Centre*
University of Leeds, School of Mathematics*
University of Leeds, School of Earth and Environment
University of Leeds, School of Physics and Astronomy*
University of Leicester, Department of Geology*
University of Leicester, Department of Physics and Astronomy*
University of Liverpool, School of Environmental Sciences*
Liverpool John Moores University, Astrophysics Research Institute*
University of Manchester, School of Physics and Astronomy*
University of Manchester, School of Earth and Environmental Sciences*
Newcastle University, School of Engineering
Newcastle University, School of Mathematics and Statistics*
Northumbria University, Department of Mathematics, Physics and Electrical Engineering*
University of Nottingham, School of Physics & Astronomy
Open University, Department of Environment, Earth & Ecosystems*
Open University, Department of Physical & Astronomy*
Oxford University, Department of Earth Sciences*
Oxford University, Department Astrophysics and Physics*
Plymouth University, Centre for Research in Earth Sciences (CRES)*
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, Department of Meteorology*
Royal Holloway, University of London, Department of Earth Sciences*
University of Sheffield, Department of Mathematics and Statistics*
University of Sheffield, Department of Physics and Astronomy*
University of Southampton, School of Physics & Astronomy
University of Southampton, School of Ocean and Earth Sciences
University of St Andrews, School of Mathematics and Statistics*
University of St Andrews, School of Physics & Astronomy*
University of Strathclyde, Department of Physics*
University of Strathclyde, Department of Civil and Environmental Engineering*
University of Surrey, Department of Physics
University of Sussex, Astronomy Centre*
Swansea University, Department of Geography*
University College London, Department of Earth Sciences*
University College London, Department of Physics and Astronomy*
University College London, Department of Space & Climate Physics (MSSL)*
University of Warwick, Department of Physics*
University of York, School of Physics, Engineering and Technology*

Data from the following research establishments was used for the 2023 study. None of the research establishments responded to the survey so information for the survey was reconstructed from the research establishments' websites. Some research establishments do not list their researchers on their websites so were not included:

Armagh Observatory
British Antarctic Survey (BAS)
British Geological Survey (BGS)
International Seismological Centre
Met Office
National Oceanography Centre

Appendix C: The Questionnaire for University Departments and Research Establishments

The Demographics and Research Interests of the UK Astronomy and Geophysics Communities 2023

The Royal Astronomical Society has carried out several surveys to establish the number of staff and postgraduate students in the UK in astronomy, space science and geophysics. The last such survey was carried out in 2016.

We would be very grateful for your help in completing this year's survey which is following the same pattern as the 2016 and 2010 projects. Our approach is to collect demographic information directly from departments/institutes carrying out research in astronomy, solar system science and solid-Earth geophysics. It would be enormously helpful if you could provide demographic information about your current staff working in the areas of interest and provide information on those staff in those areas who have left and joined in the last 5 years. Additionally, we are asking you to provide information on the research students currently registered with you. The attached questionnaire will guide you through the data we would like you to provide.

Once again the second part of our study will comprise a questionnaire for individuals to collect 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 online and we will be contacting you again in the near future to ask you to distribute the link to the 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. The focus of the Society is very much on encouraging representative diversity in the workforce and student body, and we need reliable data to help us establish whether our initiatives in this area are effective.

Once again we have engaged Sean McWhinnie at Oxford Research and Policy to help us with this project. Sean worked on the 2010 and 2016 studies.

Please could you return the questionnaire either electronically or in paper form directly to Sean McWhinnie as soon as is reasonably possible and ideally before 31st March 2023. Sean's contact details are:

Sean McWhinnie
Oxford Research and Policy
7 Ashton Common
Steeple Ashton
Trowbridge
Wiltshire
BA14 6DY

Email: sean@oxfordresearchandpolicy.co.uk
Tel: 07967 153296

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

Thank you for your help with this project.

Robert Massey
Deputy Executive Director
Royal Astronomical Society

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 sex. Definitions of the of Broad Teaching/Research Areas are set out below.

	Position/Grade	20-24		25-29		30-34		35-39		40-44		45-49		50-54		55-59		60-64		65-69		70+		Not dis-closed		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	M	F
Astronomy	Professor																										
	Senior Lecturer/Reader (or equivalent)																										
	Lecturer (or equivalent)																										
	Research Staff on Open-ended contracts																										
	Research Staff on Fixed-Term contracts																										
	Technical/Support Staff on Open ended contracts																										
	Technical/Support staff on Fixed-Term contracts																										
	Long Term Visitors undertaking research																										
	Other Scientific and Technical Staff																										
	Total																										
Solar System Science	Professor																										
	Senior Lecturer/Reader (or equivalent)																										
	Lecturer (or equivalent)																										
	Research Staff on Open-ended contracts																										
	Research Staff on Fixed-Term contracts																										
	Technical/Support Staff on Open ended contracts																										
	Technical/Support staff on Fixed-Term contracts																										
	Long Term Visitors undertaking research																										
	Other Scientific and Technical Staff																										
	Total																										

	Position/Grade	20-24		25-29		30-34		35-39		40-44		45-49		50-54		55-59		60-64		65-69		70+		Not dis-closed		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)																										
	Research Staff on Open-ended contracts																										
	Research Staff on Fixed-Term contracts																										
	Technical/Support Staff on Open ended contracts																										
	Technical/Support staff on Fixed-Term contracts																										
	Long Term Visitors undertaking research																										
	Other Scientific and Technical Staff																										
	Total																										
Cross Disciplinary	Professor																										
	Senior Lecturer/Reader (or equivalent)																										
	Lecturer (or equivalent)																										
	Research Staff on Open-ended contracts																										
	Research Staff on Fixed-Term contracts																										
	Technical/Support Staff on Open ended contracts																										
	Technical/Support staff on Fixed-Term contracts																										
	Long Term Visitors undertaking research																										
	Other Scientific and Technical Staff																										
	Total																										

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 2018 - 2023	Reason for leaving															
		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
Astronomy	Permanent Academic Staff																
	Research Staff on Open-ended contracts																
	Research Staff on Fixed-Term contracts																
	Technical/Support Staff on Open-ended contracts																
	Technical/Support staff on Fixed-Term contracts																
	Other Scientific and Technical Staff																
Solar System Science	Permanent Academic Staff																
	Research Staff on Open-ended contracts																
	Research Staff on Fixed-Term contracts																
	Technical/Support Staff on Open-ended contracts																
	Technical/Support staff on Fixed-Term contracts																
	Other Scientific and Technical Staff																
Solid Earth Geophysics	Permanent Academic Staff																
	Research Staff on Open-ended contracts																
	Research Staff on Fixed-Term contracts																
	Technical/Support Staff on Open-ended contracts																
	Technical/Support staff on Fixed-Term contracts																
	Other Scientific and Technical Staff																
Cross Disciplinary	Permanent Academic Staff																
	Research Staff on Open-ended contracts																
	Research Staff on Fixed-Term contracts																
	Technical/Support Staff on Open-ended contracts																
	Technical/Support staff on Fixed-Term contracts																
	Other Scientific and Technical Staff																

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 2018 - 2023	20-24		25-29		30-34		35-39		40-44		45-49		50-54		55-59		60-64		65-69		Not disclosed	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			M	F
Astronomy	Permanent Academic Staff																						
	Research Staff on Open-ended contracts																						
	Research Staff on Fixed-Term contracts																						
	Technical/Support Staff on Open-ended contracts																						
	Technical/Support staff on Fixed-Term contracts																						
	Other Scientific and Technical Staff																						
Solar System Science	Permanent Academic Staff																						
	Research Staff on Open-ended contracts																						
	Research Staff on Fixed-Term contracts																						
	Technical/Support Staff on Open-ended contracts																						
	Technical/Support staff on Fixed-Term contracts																						
	Other Scientific and Technical Staff																						
Solid Earth Geophysics	Permanent Academic Staff																						
	Research Staff on Open-ended contracts																						
	Research Staff on Fixed-Term contracts																						
	Technical/Support Staff on Open-ended contracts																						
	Technical/Support staff on Fixed-Term contracts																						
	Other Scientific and Technical Staff																						
Cross Disciplinary	Permanent Academic Staff																						
	Research Staff on Open-ended contracts																						
	Research Staff on Fixed-Term contracts																						
	Technical/Support Staff on Open-ended contracts																						
	Technical/Support staff on Fixed-Term contracts																						
	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
Astronomy												
Solar System Science												
Solid Earth Geophysics												
Cross Disciplinary												

Full Time, EU 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
Astronomy												
Solar System Science												
Solid Earth Geophysics												
Cross Disciplinary												

Full Time, Non-UK/Non-EU 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
Astronomy												
Solar System Science												
Solid Earth Geophysics												
Cross Disciplinary												

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
Astronomy												
Solar System Science												
Solid Earth Geophysics												
Cross Disciplinary												

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
Al 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

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)
CF Cross Discipline - Space Weather
CG Cross Discipline - Telescopes and Instrumentation

SOLAR SYSTEM SCIENCE (including The EARTH as a Planet)
SA Solar System - origin/evolution
SB Meteorites/Comets/Asteroids
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
Sl 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)
CF Cross Discipline - Space Weather
CG Cross Discipline - Telescopes and Instrumentation

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

CROSS DISCILINARY

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)
CF Cross Discipline - Space Weather
CG Cross Discipline - Telescopes and Instrumentation

Appendix D: The Individual Questionnaire

The Demographics and Research Interests of the UK Astronomy and Geophysics 2023

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 are a permanent member of staff, a fixed-term postdoctoral researcher, or a postgraduate student in a university or research institute.

Please note that some questions have many options and do not display well on a mobile. The survey is best completed on a tablet or desktop/laptop.

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 Director (rm@ras.org.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 GDPR, however we ask you to be aware that the information will be held on a computerised database.

Full details of the Royal Astronomical Society's Privacy Policy can be found here.

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 or equivalent (e.g. Associate Professor) *(Go to Permanent staff: about you)*
- ☐ Lecturer or equivalent (e.g. Assistant Professor) *(Go to Permanent staff: about you)*
- ☐ Research Fellow/Staff on open-ended contract (Research Facility/Research Institute) (*Go to Permanent Research Fellows: funding*)
- ☐ Permanent Research Fellow/Staff (University) (*Go to Permanent Research Fellows: funding*)
- ☐ Research Fellow on a fixed term contract (*Go to Postdoctoral fellows: about you*)
- ☐ Postdoctoral Research Associate *(Go to Postdoctoral fellows: about you)*
- ☐ Technical support or professional services staff (excl. admin) *(Go to Technical, support and professional services staff: about you)*
- ☐ Hourly paid/ Casual staff (*Go to Hourly Paid / casual Staff: about you*)
- ☐ Long-term visitor (*Go to Long-term visitor*)
- ☐ Postgraduate Research Student (*Go to Research students: about you*)
- ☐ Honorary/Retired/Emeritus Staff (Not research active) (*Go to Thank you*)
- ☐ Honorary/Retired/Emeritus Staff (Research active) *(Go to Permanent staff: about you)*
- ☐ Other (please specify) _____ (*Go to Thank you)*

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.

_____

Hourly Paid / Casual Staff: funding

What is your age?

- ☐ 20-24
- ☐ 25-29
- ☐ 30-34
- ☐ 35-39
- ☐ 40-44
- ☐ 45-49
- ☐ 50-54
- ☐ 55-59
- ☐ 60-64
- ☐ 65-69
- ☐ 70+
- ☐ Do not wish to say

Which of these best describes your gender?

- ☐ Woman
- ☐ Man
- ☐ Non-binary
- ☐ Other
- ☐ Do not wish to say

Does your gender identity match your sex as registered at birth?

- ☐ Yes
- ☐ No
- ☐ Prefer not to say

Do you consider yourself to be:

- ☐ Bisexual
- ☐ Gay or lesbian
- ☐ Heterosexual or straight
- ☐ Other
- ☐ Do not wish to say

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

_____

What is your nationality?

- ☐ British
- ☐ National of a European Union country
- ☐ USA
- ☐ Do not wish to say
- ☐ Other (please specify)_____

What is your ethnic group?

- ☐ Arab
- ☐ Asian: Chinese
- ☐ Asian: Bangladeshi
- ☐ Asian: Indian
- ☐ Asian: Pakistani
- ☐ Other Asian
- ☐ Black African
- ☐ Black Caribbean
- ☐ Other Black
- ☐ White (British)
- ☐ Irish
- ☐ Gypsy or Irish Traveller
- ☐ Other White
- ☐ Chinese
- ☐ Mixed: White and Asian
- ☐ Mixed: White and Black African
- ☐ Mixed: White and Black Caribbean
- ☐ Other Mixed Background
- ☐ Do not wish to say
- ☐ Any other ethnic group (please specify) _____

What is your religion?

- ☐ Buddhist
- ☐ Christian
- ☐ Hindu
- ☐ Jewish
- ☐ Muslim
- ☐ Sikh
- ☐ No religion
- ☐ Do not wish to say
- ☐ Any religion (please specify) _____

Do you consider yourself disabled?

- ☐ Yes
- ☐ No
- ☐ Do not wish to say

How many children do you have?

	Number of Children
Pre-school children (under 5 years old)	☐
School age children (5 to 18 years old)	☐
Grown up children (Above 18 years old)	☐

Hourly Paid / Casual Staff: your role

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	
Facility operations and maintenance	
Instrumentation	
Research	
Teaching	
Administration	
Public engagement/Outreach	
Other (please specify below)	

Please describe your "other" activities_____

Hourly Paid / Casual 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

Go to: Thank you

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?
If you cannot define a main source of funding, please select all that apply.

- ☐ STFC
- ☐ NERC
- ☐ EPSRC
- ☐ BBSRC
- ☐ UK Space Agency
- ☐ Royal Society
- ☐ European Commission
- ☐ Industry
- ☐ University/Department
- ☐ Royal Astronomical Society
- ☐ Other (please specify) _____

Permanent staff: about you

What is your age?

- ☐ 20-24
- ☐ 25-29
- ☐ 30-34
- ☐ 35-39
- ☐ 40-44
- ☐ 45-49
- ☐ 50-54
- ☐ 55-59
- ☐ 60-64
- ☐ 65-69
- ☐ 70+
- ☐ Do not wish to say

Which of these best describes your gender?

- ☐ Woman
- ☐ Man
- ☐ Non-binary
- ☐ Other
- ☐ Do not wish to say

Does your gender identity match your sex as registered at birth?

- ☐ Yes
- ☐ No
- ☐ Prefer not to say

Do you consider yourself to be:

- ☐ Bisexual
- ☐ Gay or lesbian
- ☐ Heterosexual or straight
- ☐ Other
- ☐ 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
- ☐ Do not wish to say

What is your nationality?

- ☐ British
- ☐ National of an European Union country
- ☐ USA
- ☐ Do not wish to say
- ☐ Other (please specify)_____

What is your ethnic group?

- ☐ Arab
- ☐ Asian: Chinese
- ☐ Asian: Bangladeshi
- ☐ Asian: Indian
- ☐ Asian: Pakistani
- ☐ Other Asian
- ☐ Black African
- ☐ Black Caribbean
- ☐ Other Black
- ☐ White (British)
- ☐ Irish
- ☐ Gypsy or Irish Traveller
- ☐ Other White
- ☐ Chinese
- ☐ Mixed: White and Asian
- ☐ Mixed: White and Black African
- ☐ Mixed: White and Black Caribbean
- ☐ Other Mixed Background
- ☐ Do not wish to say
- ☐ Any other ethnic group (please specify) _____

What is your religion?

- ☐ Buddist
- ☐ Christian
- ☐ Hindu
- ☐ Jewish
- ☐ Muslim
- ☐ Sikh
- ☐ No religion
- ☐ Do not wish to say
- ☐ Other religion (please specify) _____

Do you consider yourself disabled?

- ☐ Yes
- ☐ No
- ☐ Do not wish to say

How many children do you have?

	Number of Children
Pre-school children (under 5 years old)	☐
School age children (5 to 18 years old)	☐
Grown up children (Above 18 years old)	☐

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

- ☐ Yes (*Go to Permanent staff: career breaks*)
- ☐ No (*Go to Permanent staff: your research*)

Permanent staff: career breaks

For what reasons have one or more career break(s)?
Please mark all that apply, indicating if the most recent period of leave in each category was paid, unpaid, or partially paid.

	Paid	Unpaid	Partially Paid
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)?

- ☐ 3-6 months
- ☐ 6-12 months
- ☐ 1-2 years
- ☐ 2-3 years
- ☐ 3-4 years
- ☐ 4-5 years
- ☐ 5-10 years
- ☐ 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 (*Go to Thank you*)
- ☐ 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)_____

Permanent staff: 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 associated with job	
External professional activities (journal editing, professional body work, etc)	
Public engagement/outreach	
Other	

Please describe your other activities_____

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
- ☐ Al 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)
- ☐ CF Cross Discipline — Space Weather
- ☐ CG Cross Discipline — Telescopes and Instrumentation
- ☐ 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
- ☐ Sl* 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)
☐ CF Cross Discipline — Space Weather
☐ CG Cross Discipline — Telescopes and Instrumentation
☐ 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
☐ 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 Dark Energy
☐ 7 Other

SE to SK Planetary Science:

☐ 1 Mercury
☐ 2 Venus
☐ 3 Earth
☐ 4 Mars
☐ 5 Jupiter
☐ 6 Saturn
☐ 7 Uranus
☐ 8 Neptune
☐ 9 Pluto and other trans-Neptunian objects
☐ 10 The Moon
☐ 11 Non-earth solar system moons
☐ 12 Comets and other minor bodies
☐ 13 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			
Data reduction			
Data analysis			
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	Other (see below)	Not appli-cable
Theory and numerical modelling									
Observation/Data Collection									
Instrumentation									
Data reduction									
Data analysis									
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, or used data from, in the last 24 months.

The most commonly reported facilities from the 2010 survey are listed below. If any of the facilities you have used are not listed please list them below in the text box.

- ☐ AAO / Anglo-Australian Telescope
- ☐ Advanced Composition Explorer (ACE)
- ☐ ALMA
- ☐ APEX
- ☐ Artemis cubesats
- ☐ Australia Telescope Compact Array (ATCA)
- ☐ Australia Telescope National Facility (ATNF)
- ☐ BepiColombo
- ☐ Cassini
- ☐ Chandra
- ☐ Cluster (solar-terrestrial) satellite
- ☐ Curiosity
- ☐ DART
- ☐ European Incoherent Scatter Scientific Association (EISCAT)
- ☐ European Southern Observatory (ESO)
- ☐ FAST (Radiotelescope)
- ☐ Fermi Gamma-ray Space Telescope
- ☐ Galaxy Evolution Explorer (GALEX)
- ☐ Gemini
- ☐ Giant Metrewave Radio Telescope (GMRT) (India)
- ☐ Green Bank Telescope (GBT)
- ☐ Herschel
- ☐ Hinode
- ☐ Hubble Space Telescope
- ☐ InSight
- ☐ Instituto de Radioastronomie Millimetrique (IRAM)
- ☐ Isaac Newton Group of Telescopes (William Herschel Telescope, Isaac Newton Telescope)
- ☐ James Clerk Maxwell Telescope (JCMT - East Asian Observatory)
- ☐ James Webb Space Telescope (JWST)
- ☐ JUNO
- ☐ Keck Telescope
- ☐ Kepler/ Kepler K2
- ☐ Laser Interferometer Gravitational-wave Observatory (LIGO)
- ☐ Liverpool Telescope (LT)
- ☐ LOFAR / Westerbork
- ☐ LRO
- ☐ MAVEN
- ☐ MERLIN / e-MERLIN
- ☐ New Horizons
- ☐ New Technology Telescope (NTT)
- ☐ Parker Solar Probe
- ☐ Perseverance
- ☐ Pierre Auger Telescope
- ☐ Rosetta
- ☐ SKA Pathfinders
- ☐ Sloan Digital Sky Survey (SDSS)
- ☐ SOHO - satellite
- ☐ Solar Dynamics Observatory
- ☐ Solar Orbiter
- ☐ Solar TErrestrial RElations Observatory (STEREO)
- ☐ South African Astronomical Observatory (SAAO)
- ☐ Spitzer (infrared observatory)
- ☐ Subaru (Japan - on Hawaii)
- ☐ SuperWASP
- ☐ Swift gamma-ray burst mission
- ☐ Trace Gas Orbiter
- ☐ UKIRT
- ☐ Very Large Array (VLA) / Expanded Very Large Array (EVLA)
- ☐ Visible and Infrared Survey Telescope for Astronomy (VISTA)
- ☐ XMM-Newton

If any of the facilities you have used are not listed above please list them below.

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

Go to: Thank you

Technical, support and professional services staff: about you

What is your age?

- ☐ 20-24
- ☐ 25-29
- ☐ 30-34
- ☐ 35-39
- ☐ 40-44
- ☐ 45-49
- ☐ 50-54
- ☐ 55-59
- ☐ 60-64
- ☐ 65-69
- ☐ 70+
- ☐ Do not wish to say

Which of these best describes your gender?

- ☐ Woman
- ☐ Man
- ☐ Non-binary
- ☐ Other
- ☐ Do not wish to say

Does your gender identity match your sex as registered at birth?

- ☐ Yes
- ☐ No
- ☐ Prefer not to say

Do you consider yourself to be:

- ☐ Bisexual
- ☐ Gay or lesbian
- ☐ Heterosexual or straight
- ☐ Other
- ☐ Do not wish to say

Are you part-time or full-time?

- ☐ Part-time
- ☐ Full-time
- ☐ Do not wish to say

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

- ☐ Permanent
- ☐ Temporary
- ☐ Do not wish to say

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

_____

What is your nationality?

- ☐ British
- ☐ National of an European Union country
- ☐ USA
- ☐ Do not wish to say
- ☐ Other (please specify)_____

What is your ethnic group?

- ☐ Arab
- ☐ Asian: Chinese
- ☐ Asian: Bangladeshi
- ☐ Asian: Indian
- ☐ Asian: Pakistani
- ☐ Other Asian
- ☐ Black African
- ☐ Black Caribbean
- ☐ Other Black
- ☐ White (British)
- ☐ Irish
- ☐ Gypsy or Irish Traveller
- ☐ Other White
- ☐ Chinese
- ☐ Mixed: White and Asian
- ☐ Mixed: White and Black African
- ☐ Mixed: White and Black Caribbean
- ☐ Other Mixed Background
- ☐ Do not wish to say
- ☐ Any other ethnic group (please specify) _____

What is your religion?

- ☐ Buddist
- ☐ Christian
- ☐ Hindu
- ☐ Jewish
- ☐ Muslim
- ☐ Sikh
- ☐ No religion
- ☐ Do not wish to say
- ☐ Any religion (please specify) _____

Do you consider yourself disabled?

- ☐ Yes
- ☐ No
- ☐ Do not wish to say

How many children do you have?

	Number of Children
Pre-school children (under 5 years old)	☐
School age children (5 to 18 years old)	☐
Grown up children (Above 18 years old)	☐

Technical, support and professional services staff: your role

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	
Facility operations and maintenance	
Instrumentation	
Research	
Teaching	
Administration	
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

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

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

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

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

_____

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

Technical, support and professional services 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

Go to: Thank you

Postdoctoral fellows: about you

What is your age?

- ☐ 20-24
- ☐ 25-29
- ☐ 30-34
- ☐ 35-39
- ☐ 40-44
- ☐ 45-49
- ☐ 50-54
- ☐ 55-59
- ☐ 60-64
- ☐ 65-69
- ☐ 70+
- ☐ Do not wish to say

Which of these best describes your gender?

- ☐ Woman
- ☐ Man
- ☐ Non-binary
- ☐ Other
- ☐ Do not wish to say

Does your gender identity match your sex as registered at birth?

- ☐ Yes
- ☐ No
- ☐ Prefer not to say

Do you consider yourself to be:

- ☐ Bisexual
- ☐ Gay or lesbian
- ☐ Heterosexual or straight
- ☐ Other
- ☐ 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
- ☐ Do not wish to say

What is your nationality?

- ☐ British
- ☐ National of an European Union country
- ☐ USA
- ☐ Do not wish to say
- ☐ Other (please specify)_____

What is your ethnic group?

- ☐ Arab
- ☐ Asian: Chinese
- ☐ Asian: Bangladeshi
- ☐ Asian: Indian
- ☐ Asian: Pakistani
- ☐ Other Asian
- ☐ Black African
- ☐ Black Caribbean
- ☐ Other Black
- ☐ White (British)
- ☐ Irish
- ☐ Gypsy or Irish Traveller
- ☐ Other White
- ☐ Chinese
- ☐ Mixed: White and Asian
- ☐ Mixed: White and Black African
- ☐ Mixed: White and Black Caribbean
- ☐ Other Mixed Background
- ☐ Do not wish to say
- ☐ Any other ethnic group (please specify) _____

What is your religion?

- ☐ Buddist
- ☐ Christian
- ☐ Hindu
- ☐ Jewish
- ☐ Muslim
- ☐ Sikh
- ☐ No religion
- ☐ Do not wish to say
- ☐ Other religion (please specify) _____

Do you consider yourself disabled?

- ☐ Yes
- ☐ No
- ☐ Do not wish to say

How many children do you have?

	Number of Children
Pre-school children (under 5 years old)	☐
School age children (5 to 18 years old)	☐
Grown up children (Above 18 years old)	☐

In which country did you obtain your doctorate?

- ☐ UK
- ☐ Other European Union
- ☐ USA
- ☐ Elsewhere (please specify)_____

How many years ago (whole or part) did you receive your doctorate?_____

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 (*Go to Thank you*)
☐ 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
☐ Al 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)
☐ CF Cross Discipline — Space Weather
☐ CG Cross Discipline — Telescopes and Instrumentation
☐ 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
☐ Sl* 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)
☐ CF Cross Discipline — Space Weather
☐ CG Cross Discipline — Telescopes and Instrumentation
☐ 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
☐ 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 Dark Energy
☐ 7 Other

SE to SK Planetary Science:

☐ 1 Mercury
☐ 2 Venus
☐ 3 Earth
☐ 4 Mars
☐ 5 Jupiter
☐ 6 Saturn
☐ 7 Uranus
☐ 8 Neptune
☐ 9 Pluto and other trans-Neptunian objects
☐ 10 The Moon
☐ 11 Non-earth solar system moons
☐ 12 Comets and other minor bodies
☐ 13 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			
Data reduction			
Data analysis			
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	Other (see below)	Not appli-cable
Theory and numerical modelling									
Observation/Data Collection									
Instrumentation									
Data reduction									
Data analysis									
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, or used data from, in the last 24 months.

The most commonly reported facilities from the 2010 survey are listed below. If any of the facilities you have used are not listed please list them below in the text box.

- ☐ AAO / Anglo-Australian Telescope
- ☐ Advanced Composition Explorer (ACE)
- ☐ ALMA
- ☐ APEX
- ☐ Artemis cubesats
- ☐ Australia Telescope Compact Array (ATCA)
- ☐ Australia Telescope National Facility (ATNF)
- ☐ BepiColombo
- ☐ Cassini
- ☐ Chandra
- ☐ Cluster (solar-terrestrial) satellite
- ☐ Curiosity
- ☐ DART
- ☐ European Incoherent Scatter Scientific Association (EISCAT)
- ☐ European Southern Observatory (ESO)
- ☐ FAST (Radiotelescope)
- ☐ Fermi Gamma-ray Space Telescope
- ☐ Galaxy Evolution Explorer (GALEX)
- ☐ Gemini
- ☐ Giant Metrewave Radio Telescope (GMRT) (India)
- ☐ Green Bank Telescope (GBT)
- ☐ Herschel
- ☐ Hinode
- ☐ Hubble Space Telescope
- ☐ InSight
- ☐ Instituto de Radioastronomie Millimetrique (IRAM)
- ☐ Isaac Newton Group of Telescopes (William Herschel Telescope, Isaac Newton Telescope)
- ☐ James Clerk Maxwell Telescope (JCMT - East Asian Observatory)
- ☐ James Webb Space Telescope (JWST)
- ☐ JUNO
- ☐ Keck Telescope
- ☐ Kepler/ Kepler K2
- ☐ Laser Interferometer Gravitational-wave Observatory (LIGO)
- ☐ Liverpool Telescope (LT)
- ☐ LOFAR / Westerbork
- ☐ LRO
- ☐ MAVEN
- ☐ MERLIN / e-MERLIN
- ☐ New Horizons
- ☐ New Technology Telescope (NTT)
- ☐ Parker Solar Probe
- ☐ Perseverance
- ☐ Pierre Auger Telescope
- ☐ Rosetta
- ☐ SKA Pathfinders
- ☐ Sloan Digital Sky Survey (SDSS)
- ☐ SOHO - satellite
- ☐ Solar Dynamics Observatory
- ☐ Solar Orbiter
- ☐ Solar TErrestrial RElations Observatory (STEREO)
- ☐ South African Astronomical Observatory (SAAO)
- ☐ Spitzer (infrared observatory)
- ☐ Subaru (Japan - on Hawaii)
- ☐ SuperWASP
- ☐ Swift gamma-ray burst mission
- ☐ Trace Gas Orbiter
- ☐ UKIRT
- ☐ Very Large Array (VLA) / Expanded Very Large Array (EVLA)
- ☐ Visible and Infrared Survey Telescope for Astronomy (VISTA)
- ☐ XMM-Newton

If any of the facilities you have used are not listed above please list them below.

Go to: Thank you

Postdoctoral fellows: your funding

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

- ☐ STFC
- ☐ NERC
- ☐ EPSRC
- ☐ BBSRC
- ☐ UK Space Agency
- ☐ Other (please specify) _____
- ☐ Royal Society
- ☐ European Commission
- ☐ The University/Department
- ☐ Royal Astronomical Society
- ☐ Industry

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 (Go to: Postdoctoral fellows: your offer)
- ☐ No (Go to: Postdoctoral fellows: your plans)

Go to: Postdoctoral fellows: the future

Postdoctoral fellows: your offer

Is your offer in the UK or overseas?

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

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
- ☐ Other science-related role (e.g. scientific publishing, science communication, technical sales, etc.)
- ☐ Non-scientific-related role
- ☐ Other (please specify)_____

Postdoctoral fellows: your prospects

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
☐ Other science-related role (e.g. scientific publishing, science communication, technical sales, etc.)
☐ Non-scientific-related 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
☐ Other science-related role (e.g. scientific publishing, science communication, technical sales, etc.)
☐ Non-scientific-related 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

Go to: Thank you

Research students: about you

What is your age?

- ☐ 20
- ☐ 21
- ☐ 22
- ☐ 23
- ☐ 24
- ☐ 25
- ☐ 26
- ☐ 27
- ☐ 28
- ☐ 29
- ☐ 30
- ☐ 31-40
- ☐ 40+

Which of these best describes your gender?

- ☐ Woman
- ☐ Man
- ☐ Non-binary
- ☐ Other
- ☐ Do not wish to say

Does your gender identity match your sex as registered at birth?

- ☐ Yes
- ☐ No
- ☐ Prefer not to say

Do you consider yourself to be:

- ☐ Bisexual
- ☐ Gay or lesbian
- ☐ Heterosexual or straight
- ☐ Other
- ☐ Do not wish to say

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

_____

What is your nationality?

- ☐ British
- ☐ National of a European Union Country
- ☐ USA
- ☐ Do not wish to say
- ☐ Other (please specify)_____

What is your ethnic group?

- ☐ Arab
- ☐ Asian: Chinese
- ☐ Asian: Bangladeshi
- ☐ Asian: Indian
- ☐ Asian: Pakistani
- ☐ Other Asian
- ☐ Black African
- ☐ Black Caribbean
- ☐ Other Black
- ☐ White (British)
- ☐ Irish
- ☐ Gypsy or Irish Traveller
- ☐ Other White
- ☐ Chinese
- ☐ Mixed: White and Asian
- ☐ Mixed: White and Black African
- ☐ Mixed: White and Black Caribbean
- ☐ Other Mixed Background
- ☐ Do not wish to say
- ☐ Any other ethnic group (please specify) _____

What is your religion?

- ☐ Buddist
- ☐ Christian
- ☐ Hindu
- ☐ Jewish
- ☐ Any religion (please specify) _____
- ☐ Muslim
- ☐ Sikh
- ☐ No religion
- ☐ Do not wish to say

Do you consider yourself disabled?

- ☐ Yes
- ☐ No
- ☐ Do not wish to say

How many children do you have?

	Number of Children
Pre-school children (under 5 years old)	☐
School age children (5 to 18 years old)	☐
Grown up children (Above 18 years old)	☐

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 (*Go to: Thank you*)
- ☐ 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_____

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
- ☐ UK Space Agency
- ☐ Other (please specify) _____
- ☐ The University/Department
- ☐ Industry
- ☐ European Commission
- ☐ Royal Astronomical Society
- ☐ Self-Funded

What degree are you studying for?

- ☐ Masters
- ☐ Doctorate

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

- ☐ Full-time (*Go to: Research students: part time*)
- ☐ Part-time (*Go to: Research students: your research areas*)

Research students: part time

If part-time, what else are you doing?

- ☐ Caring for family members
- ☐ Employed full-time
- ☐ Employed part-time
- ☐ Voluntary work
- ☐ Do not wish to say
- ☐ 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

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
- ☐ Al 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)
- ☐ CF Cross Discipline — Space Weather
- ☐ CG Cross Discipline — Telescopes and Instrumentation
- ☐ 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
☐ Sl* 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)
☐ CF Cross Discipline — Space Weather
☐ CG Cross Discipline — Telescopes and Instrumentation
☐ 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
☐ 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 Dark Energy
☐ 7 Other

SE to SK Planetary Science:

☐ 1 Mercury
☐ 2 Venus
☐ 3 Earth
☐ 4 Mars
☐ 5 Jupiter
☐ 6 Saturn
☐ 7 Uranus
☐ 8 Neptune
☐ 9 Pluto and other trans-Neptunian objects
☐ 10 The Moon
☐ 11 Non-earth solar system moons
☐ 12 Comets and other minor bodies
☐ 13 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

When do you expect to submit your thesis?

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

Are you currently writing up your thesis?

- ☐ Yes
- ☐ No

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: Teaching activities

Have you undertaken any teaching activities during your doctorate?

Please mark all that apply.

- ☐ Yes, I have acted as a demonstrator in practical classes (*Go to: Research Students: Teaching Activities 2*)
- ☐ Yes, I have lead small group tutorials (*Go to: Research Students: Teaching Activities 2*)
- ☐ No, I have not done any teaching (*Go to: Research Students: Public Engagement Work*)

Research students: Teaching activities 2

Have you received any training to help you deliver your teaching?

- ☐ Yes
- ☐ No

Research students: Public Engagement Work

Have you been involved in delivering any public engagement/outreach activities during you doctorate?

Please mark all that apply.

- ☐ Yes, I've acted as a STEM ambassador (*Go to: Research Students: Public Engagement Work*
- ☐ Yes, I've helped at outreach events aimed at school children (*Go to: Research Students: Public Engagement Work 2*)
- ☐ Yes, I've helped at events aimed at the general public (*Go to: Research Students: Public Engagement Work 2*)
- ☐ Yes, I've helped at events specifically aimed at encouraging girls to study physics/astronomy (*Go to: Research Students: Public Engagement Work 2*)
- ☐ No, I haven't taken part in any public engagement/outreach activities (*Go to: Research Students: your plans for the future*)

Research students: Public Engagement Work 2

On average, how much time do you estimate that you spend delivering public engagement/outreach activities each month?

- ☐ More than 5 hours
- ☐ 4 to 5 hours
- ☐ 3 to 4 hours
- ☐ 2 to 3 hours
- ☐ 1 to 2 hours
- ☐ Less than 1 hour
- ☐ Don't know

Have you had any training to help you deliver public engagement activities?

- ☐ Yes
- ☐ No

Research students: your plans for the future

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 (*Go to: Research students: your job or training offer*)
- ☐ No (*Go to: Research students: your next steps*)

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 science-related role (e.g. scientific publishing, science communication, technical sales, etc.)
- ☐ Other (please specify)_____

Where is your offer?

- ☐ In the UK
- ☐ In the European Union
- ☐ In the USA
- ☐ Elsewhere

Go to: Research students: your career plans

Research students: your next steps

Thinking ahead, are you likely to seek employment or apply for further study in the UK or abroad?

Please mark all that apply.

- ☐ I don't intend to seek employment (Go to: *Research students: your career plans*)
- ☐ Employment or further study in the UK (Go to: *Research students: your next steps 2*)
- ☐ Employment or further study outside the UK but elsewhere in the European Union (Go to: *Research students: your next steps 2*)
- ☐ Employment or further study in the USA (Go to: *Research students: your next steps 2*)
- ☐ Employment or further study elsewhere (Go to: *Research students: your next steps 2*)

Research students: your next steps 2

Which of the following, best describes the role or further study/training that you are likely to apply for?

You may select up to two options.

☐ Further study: scientific
☐ Further study: non-scientific
☐ Teacher Training
☐ Academic: Post doc
☐ Academic: Lecturer
☐ Scientist: Industry/commerce
☐ Scientist: Public sector
☐ Scientist: Other sector
☐ Other science-related role (e.g. scientific publishing, science communication, technical sales, etc.)
☐ Role not directly related to science
☐ Other (please specify) _____

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 2023.

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

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