



# The research and technical workforce in the UK

POLICY BRIEFING

THE ROYAL SOCIETY

## **Policy briefing**

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### ***The research and technical workforce in the UK***

#### ***Policy briefing***

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# Executive summary

**From 2013/14 to 2018/19, there was overall growth in both the national research and technical workforce.**

**The largest number of those employed in both the national research and technical workforces were employed in the South East, while the smallest number were employed in Northern Ireland.**

Research and innovation help to drive long-term growth and productivity, improve people's lives and opportunities, and achieve environmental sustainability goals. The UK research system is world leading. The Government has signalled its ambition for the UK to become, 'the very best place in the world to be a researcher, inventor or innovator'<sup>1</sup>. This follows Government commitments for public investment in R&D 'to reach £22 billion per year by 2024/25'<sup>2</sup> and 2.4% of GDP by 2027<sup>3</sup>.

The capacity of the UK to realise the potential of research and innovation is dependent upon having a research and technical workforce with the necessary skills able to operate at scale. The increase in the research and technical workforce required to effectively deliver the uplift in funding depends on how additional investment is allocated. The relationship between the two is unlikely to be linear. Nonetheless, some increase in the research and technical workforce will be necessary to absorb higher levels of investment effectively into an enhanced system. This increase has been estimated to be as high as 150,000<sup>4</sup>.

Neither the data contained within this report for the years 2013/14 to 2018/19, nor recently published data for 2019/20, suggest that significant growth is likely without additional action. Additionally, the coronavirus pandemic

has had a negative impact on the research and technical workforce<sup>5</sup>. Consequently, continued action is required to protect the integrity of the current UK's research and technical workforce, while putting in place measures to increase the domestic workforce and maintain the attractiveness of the UK as a destination for international researchers. This latter group, non-UK staff, make up over 30% of the academic staff in the UK, and so will be central to any effort to increase the research and technical workforce.

This report provides a high-level profile of the research and technical workforce in the UK, with indications of temporal trends. It includes data for both the national workforce and the higher education workforce. Data from the former are based on estimates created from sample data collected from a survey, while data from the latter are collected from higher education institutions based on their staff records. Consequently, for the national level data, it is not possible to generate reliable estimates in all instances. This has informed the categories of data included in this report. It is important to note that there remain some limitations with the national workforce data. The findings presented should be understood within that context. Those seeking further information should refer directly to the original data sources and the introduction and annexes of this report.

1. BEIS, R&D roadmap, 1 July 2020; [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/896799/UK\\_Research\\_and\\_Development\\_Roadmap.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/896799/UK_Research_and_Development_Roadmap.pdf)
2. BEIS, R&D roadmap, 1 July 2020; [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/896799/UK\\_Research\\_and\\_Development\\_Roadmap.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/896799/UK_Research_and_Development_Roadmap.pdf)
3. BEIS, Industrial Strategy: building a Britain fit for the future, 27 November 2017; <https://www.gov.uk/government/publications/industrial-strategy-building-a-britain-fit-for-the-future>
4. Kingman, K., 'The 2.4% challenge: where will our researchers come from?' speech at the Research culture: Changing expectations conference, The Royal Society, 30 October 2018
5. Vitae, The impact of the Covid-19 pandemic on researchers in universities and research institutes, 8 October 2020; <https://www.vitae.ac.uk/impact-and-evaluation/covid-19-impact-on-researchers>

The report's findings are presented in brief below:

- From 2013/14 to 2018/19, there was overall growth in both the national research and technical workforce. In 2018/19, engineering professionals and science, engineering and production technicians respectively accounted for the largest proportions of the research and technical workforces. Similarly, there was growth, though limited, in the number of people employed in research and technical roles in higher education.
- In absolute terms, in 2018/19, the largest number of those employed in both the national research and technical workforces were employed in the South East, while the smallest number were employed in Northern Ireland. As a proportion of the total workforce, Scotland employed the largest number of researchers, while the East Midlands employed the largest proportion of technical staff. Conversely, London employed the smallest number of both researchers and technicians as a proportion of the total workforce within that region. In 2018/19, employment in research roles in higher education was highest in both absolute terms and as a percentage of the total workforce in London. Employment in technical roles in higher education was highest in absolute terms in London, and in Scotland as a percentage of the total workforce.
- In 2018/19, the largest number of all those employed in research and technical occupations were between the ages of 25 and 49. For those employed in higher education, the majority of those in research roles were aged between 35 and 49. However, the age profile differs considerably between those employed on

permanent and temporary contracts, and between levels of seniority. In 2018/19 the majority of those employed in technical roles in higher education were aged 34 and under. However, there is variation between the different technical occupations.

- The Labour Force Survey records information about sexes as female and male. In almost all occupations the female staff employed in research roles is significantly under 50%, though there is considerable variation between occupations. The Higher Education Statistics Agency Staff record collects information about sexes as female, male and other. The other category has been included since 2017/18. Within the higher education workforce, the proportion of female staff is lower for both those employed in research and technical roles, though there is considerable variation at more granular levels. The proportion of those employed in research roles with the recorded sex other has increased since the category's introduction.

This document does not include data related to the protected characteristics of those employed in the national and higher education research and technical workforces beyond age and sex. Those seeking further information may wish to refer directly to the data sources. Additionally, the Diversity programme pages of the Royal Society website contain resources which may be of interest<sup>6</sup>. The University of Nottingham, Technician Commitment and partners produced the following report, to inform a better understanding of the equality, diversity and inclusion (EDI) challenges that exist in the technical workforce: *Equality, Diversity and Inclusion: A Technician Lens* (2018)<sup>7</sup>.

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**In 2018/19, the largest number of all those employed in research and technical occupations were between the ages of 25 and 49.**

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6. The Royal Society, Diversity in Science webpage, accessed 2 February 2021; <https://royalsociety.org/topics-policy/diversity-in-science/>

7. STEMM-CHANGE project, Equality, Diversity and Inclusion: A Technician Lens, November 2019; <https://www.stemm-change.co.uk/wp-content/uploads/2019/11/Equality-Diversity-and-Inclusion-A-Technician-Lens-web.pdf>

# Introduction

## Context

The Government's March 2020 budget confirmed that public investment in R&D would rise to £22 billion per year by 2024/25<sup>8</sup>. This represents a significant uplift. For this uplift to successfully realise improvements in output and productivity in the research base and the economy across the UK it is vital that the workforce is in place to deliver this. In a 2018 speech at the Royal Society, Sir John Kingman, then Chair of UKRI, said that achieving the Government's complementary 2.4% investment target could require an increase in the scientific workforce of 50% – commensurate with the increase in investment. In terms of people, this would mean 150,000 more researchers and a proportionate increase in technical staff<sup>9</sup>.

The impact of the coronavirus crisis on the economy has put universities and industries in an uncertain position, which in turn will affect the research and technical workforce in the UK. The impacts upon staff have been significant, with early evidence suggesting that the impact has not been felt equally across the workforce. Specifically, those at an earlier stage of their career and / or those with caring responsibilities appear to have been more severely affected<sup>10</sup>. The long-term success of the UK research system is dependent on the strength of its workforce. There is a real danger that the workforce could be damaged at the point at which it is most necessary. Any such damage could have long-lasting impact on the UK's prosperity, productivity and innovation capability.

## Purpose

This report presents data on the size and composition of the research and technical workforce. It is intended to describe the current research and technical workforce and its recent evolution, note challenges with the data, and provide a basis for further work on what an optimal research system might look like. Information has been taken from the Labour Force Survey<sup>11</sup> and the Higher Education Statistics Agency Staff record<sup>12</sup>.

8. HM Treasury, Budget 2020: Delivering on our promises to the British People, 11 March 2020; [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/871799/Budget\\_2020\\_Web\\_Accessible\\_Complete.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/871799/Budget_2020_Web_Accessible_Complete.pdf)

9. Kingman, K., 'The 2.4% challenge: where will our researchers come from?' speech at the Research culture: Changing expectations conference, the Royal Society, 30 October 2018.

10. Nature, Are women publishing less during the pandemic? Here's what the data say, 20 May 2020; [https://www.nature.com/articles/d41586-020-01294-9?utm\\_source=Nature+Briefing&utm\\_campaign=0f2156291a-briefing-dy-20200520&utm\\_medium=email&utm\\_term=0\\_c9dfd39373-0f2156291a-43897569](https://www.nature.com/articles/d41586-020-01294-9?utm_source=Nature+Briefing&utm_campaign=0f2156291a-briefing-dy-20200520&utm_medium=email&utm_term=0_c9dfd39373-0f2156291a-43897569)

11. ONS, Labour Force Survey, accessed 24 November 2020; <https://www.ons.gov.uk/surveys/informationforhouseholdsandindividuals/householdandindividualsurveys/labourforcesurvey>

12. HESA, Higher Education Staff Data, accessed 24 November 2020; <https://www.hesa.ac.uk/data-and-analysis/staff>

## Data sources

### Labour Force Survey

“The Labour Force Survey (LFS) is a study of the employment circumstances of the UK population. It is the largest household study in the UK and provides the official measures of employment and unemployment”<sup>13</sup>.

The LFS is based on a sample of household data collected on a quarterly basis.

Further information on the methodology is available from the website of the Office of National Statistics<sup>14</sup>.

As the LFS is based on sample data, the figures included within this document are estimates. In some categories, the sample sizes are too small to provide a reliable estimate or any estimate at all.

### Higher Education Statistics Agency

“The Higher Education Statistics Agency (HESA) is the expert provider of data on the UK higher education sector, and the designated data body for England”<sup>15, 16</sup>.

The Staff record data are collected on an annual basis from higher education providers. Data are collected in their raw form. In this form it can be ‘personal data’ and so it is rounded and suppressed when included in published outputs. As consequence, all data from this source are presented as rounded to the nearest five. Further information on the collection methodology is available on the HESA website<sup>17</sup>.

## Limitations

This report includes overall workforce data and by region, age and sex. We have sought to include data that are available in both sources. This includes data for age and sex. Additional data related to individuals’ protected characteristics<sup>18</sup> are available from both data sources, including both nationality and ethnicity. However, there is not consistency in the groupings for these categories between the two data sources and many of the estimates in Labour Force Survey national workforce data for these categories at an occupational level were either unreliable or absent so they have not been included in this report.

Those seeking further information on data related to these characteristics should refer directly to both data sources and other sources of evidence that examine this, including the work referenced in the executive summary.

Further information on both data sources and the approach taken in this report are included at annexes A and B. The data contained within this report are not exhaustive.

13. ONS, Labour Force Survey, accessed 24 November 2020; <https://www.ons.gov.uk/surveys/informationforhouseholdsandindividuals/householdandindividualsurveys/labourforcesurvey>

14. ONS, Labour Force Survey – user guidance, last revised 12 October 2020; <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/methodologies/labourforcesurveyuserguidance>

15. Higher Education Statistics Agency (HESA) webpage, accessed 2 February 2021; <https://www.hesa.ac.uk/>

16. NB: In September 2019, HESA’s data analytics integrated with Jisc.

17. HESA, Staff record 2018/19 - Data collection schedule, accessed 24 November 2020; [https://www.hesa.ac.uk/collection/c18025/data\\_collection\\_schedule](https://www.hesa.ac.uk/collection/c18025/data_collection_schedule)

18. Equality and Human Rights Commission, Protected characteristics, accessed 24 November 2020; <https://equalityhumanrights.com/en/equality-act/protected-characteristics>



# Chapter one

## Profile of the UK research and technical workforce

# Profile of the UK research and technical workforce

## Total

### National research and technical workforce

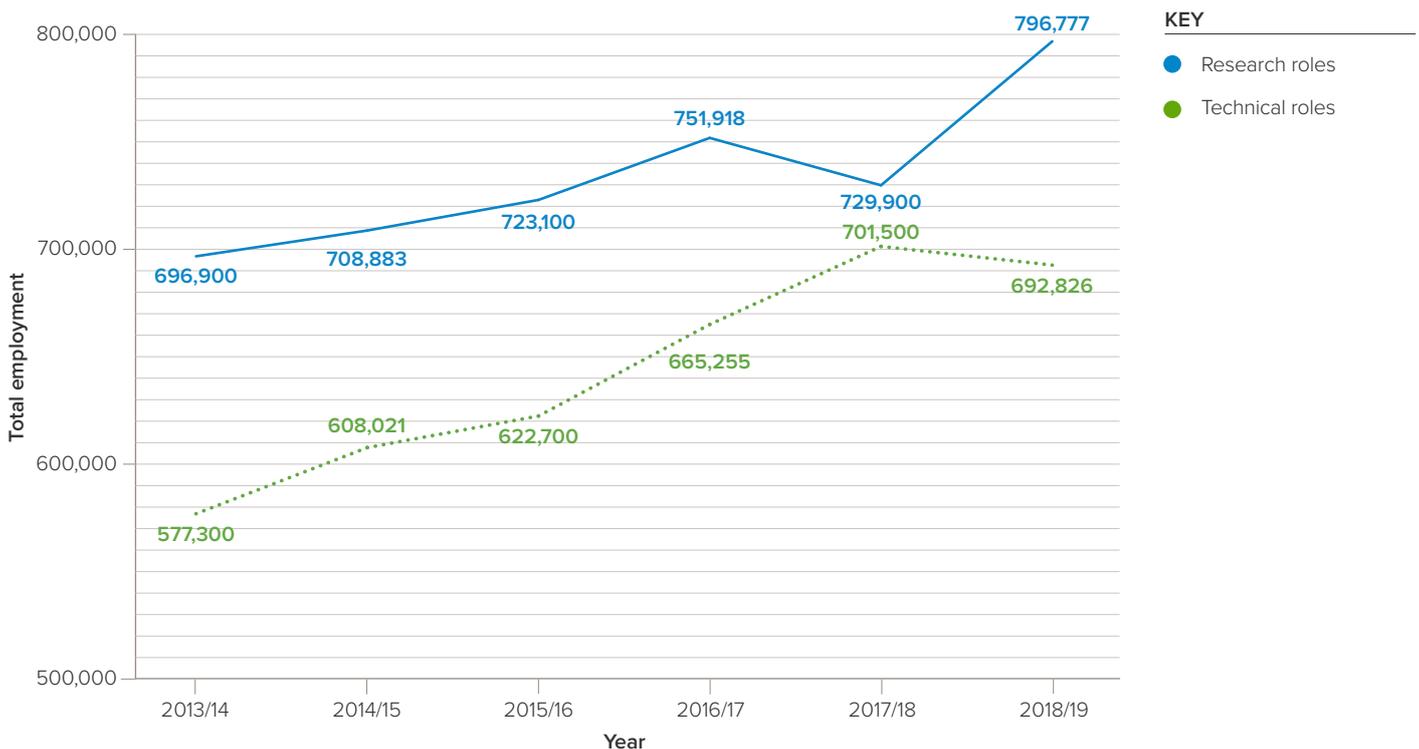
Figure 1 provides an overview of employment in all research and technical roles from 2013/14 to 2018/19. Figures 2 and 3 provide a breakdown of total employment in research and technical roles (respectively) by occupation. See the annexes for further information about Standard Occupation Classification (SOC) definitions.

From 2013/14 to 2018/19, total employment in both research and technical roles rose. For research roles, this was from 696,000 to 796,777. For technical roles, this was from 577,300 to 692,826. Over the same period, the national workforce as a whole rose from 30,246,800 to 32,466,200.

While there was an overall increase in both the national research workforce and the national technical workforce, growth was not consistent for either over the six-year period. The number of researchers fell in 2017/18, before increasing again in 2018/19, while the number of technicians fell from 2017/18 to 2018/19. In contrast, the total workforce increased year-on-year throughout this period.

FIGURE 1

Total employment in all research and technical roles in the national workforce, 2013/14 – 2018/19.



In 2018/19, the largest number employed in research roles by occupation were engineering professionals, followed by natural and social science professionals and research and development managers respectively (Figure 2). This was the case for all six years.

In 2018/19, the largest number employed in technical roles by occupation, were science, engineering technicians, health associate professionals, animal technicians, architectural technicians, and environmental technicians respectively (Figure 3). This was the case for all six years.

FIGURE 2

National research workforce by professional occupation, 2018/19.

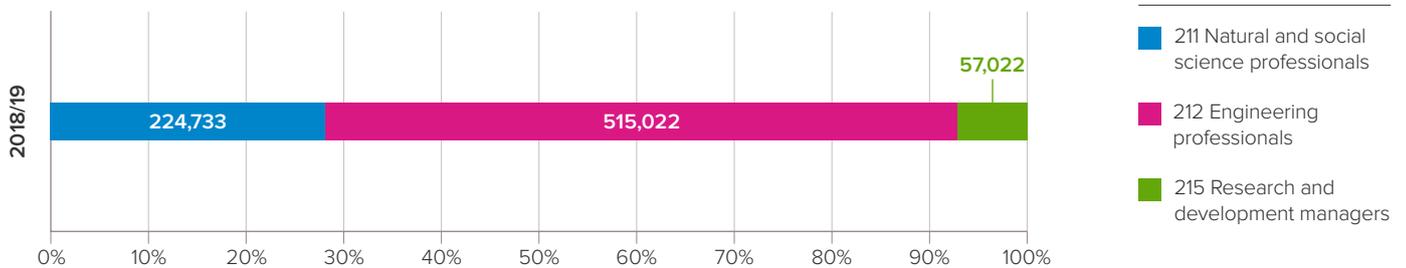
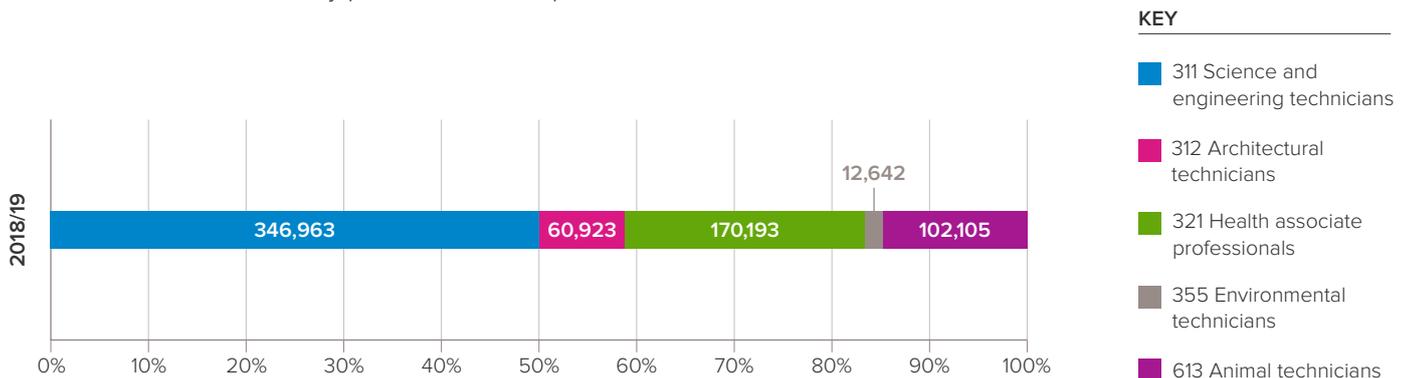


FIGURE 3

National technical workforce by professional occupation, 2018/19.



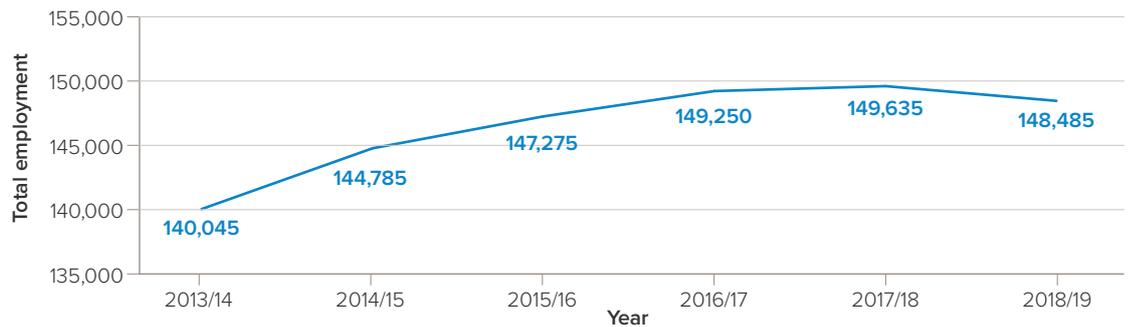
Higher education research and technical workforce

Figures 4 and 5 provide an overview of total employment in research and technical roles respectively. Figure 6 provides figures for permanent and temporary research roles in higher education in 2018/19. Figures 7 and 8 provide figures for employment in higher education in research and technical roles by occupation in 2018/19. Figures 4 and 5 illustrate an overall rise in employment in research and

technical roles in higher education. In contrast with the national workforce, research roles account for a much higher proportion of the higher education workforce than technical roles. In 2018/19, 33.75% of the higher education workforce were employed in research roles, while 3.30% were employed in technical roles. It is noticeable that there is a decrease in the last year of this data. For technical roles, this is consistent with the national workforce, while for research roles it is against the trend.

**FIGURE 4**

Total employment in all research roles in higher education, 2013/14 – 2018/19.



**FIGURE 5**

Total employment in all technical roles in higher education, 2013/14 – 2018/19.

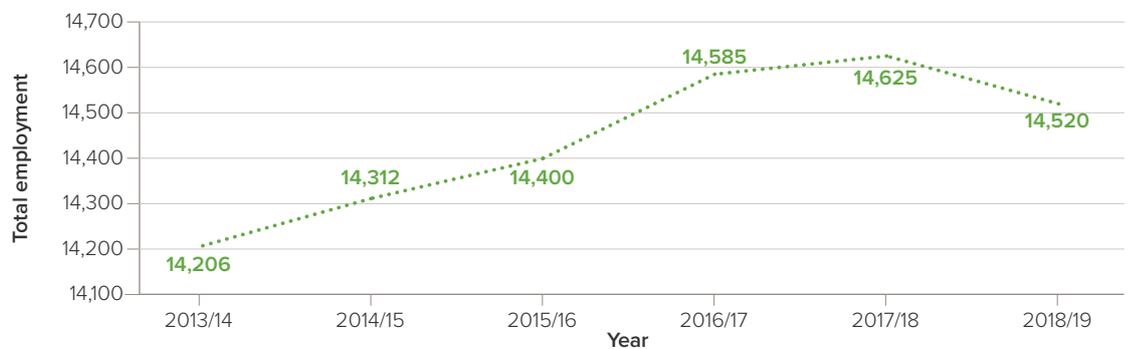


Figure 6 illustrates that the majority (71.70%) of those in research roles in 2018/19 were employed on permanent contracts. This was true for all six years, with the proportions of research staff employed on temporary and permanent contracts relatively stable over this period.

For example, in 2013/14, there were 140,045 research staff in the higher education workforce, 39,635 (28.30%) of whom were employed on temporary contracts, and 100,410 (71.70%) of whom were employed on permanent contracts.

**FIGURE 6**

Employment in higher education in temporary and permanent research roles, 2018/19.

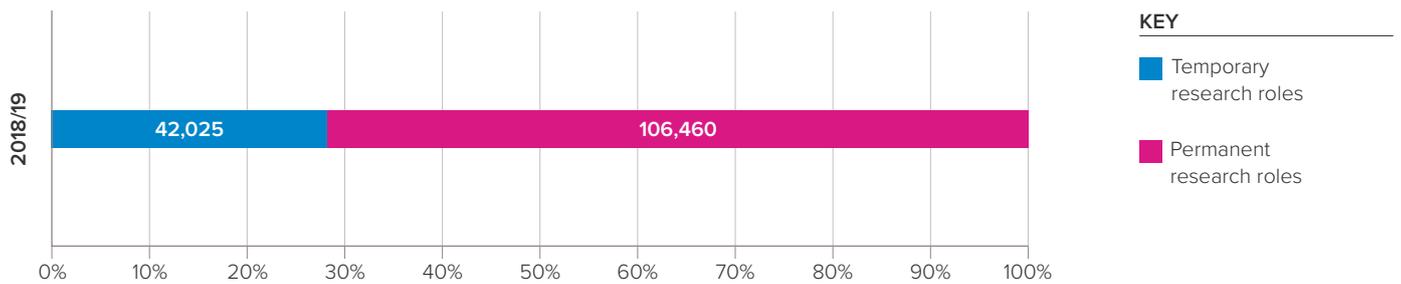


FIGURE 7

Employment in higher education in research roles by occupation 2018/19.

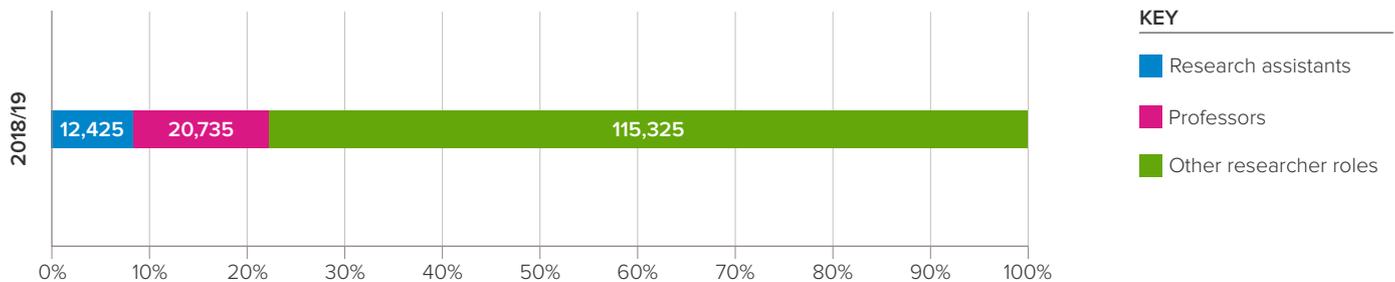


Figure 7 shows the split of research staff by contract level, with professors, research assistants and all other research staff<sup>19</sup>.

In 2018/19, the majority of those employed in research roles in higher education were in other researcher roles (77.67%), followed by professorial staff (13.96%) and research assistants (8.37%) respectively. These proportions were relatively constant over the six years, though there were changes between groups. With the exception of 2014/15, the number of professorial staff grew over the six year period, from 19,055 in 2013/14 (13.61% of the research workforce) to a maximum of 20,735 in 2018/19. Conversely, the number of research assistant staff grew from 13,065 in 2013/14 (9.33% of the research workforce) to a absolute peak of 13,830 (9.27% of the research workforce) in 2016/17, falling significantly to 11,765 (7.86%) in 2017/18.

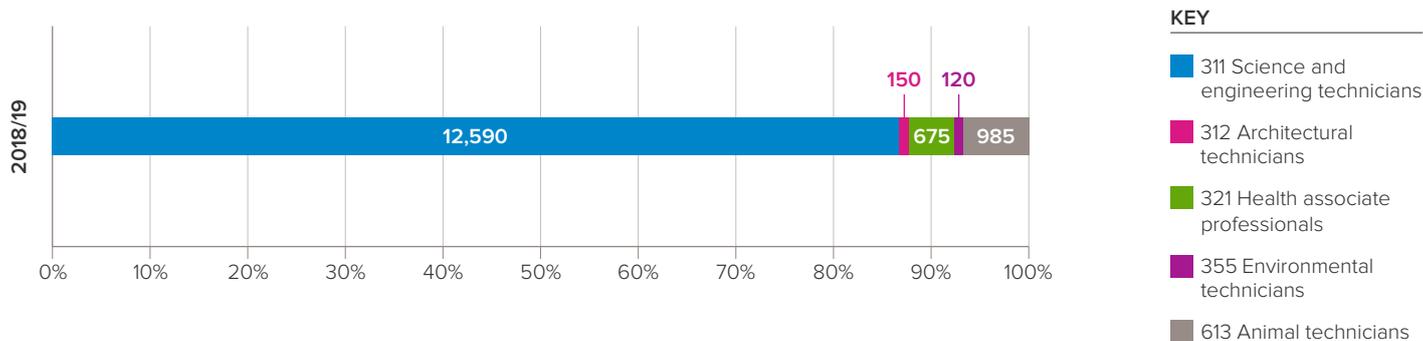
Figure 8 shows the breakdown of technical roles by occupation. These standard occupational classification codes are consistent with those used to understand the national technical workforce<sup>20</sup>. As with the national workforce, in 2018/19, science and engineering technicians made up the largest segment of the technical workforce within higher education. However, this group makes up a much larger proportion of the higher education workforce (86.71%) than in the national workforce (50.08%). In 2018/19, animal technicians (6.78%), health associate professionals (4.65%), architectural technicians (1.03%) and environmental technicians (0.83%) make up the rest of the employment in technical roles in higher education.

19. Professors are those on professorial contracts. In this context, research assistants, 'also described as postdoctoral research assistants, research associates or assistant researchers' are defined as: "...academic staff whose primary employment function is 'research only', and they are employed to carry out another individual's research programme rather than as independent researchers in their own right (except in the circumstances described in paragraph 129). They are usually funded from research grants or contracts from Research Councils, charities, the European Union (EU) or other overseas sources, industry, or other commercial enterprises, but they may also be funded from the institution's own funds." REF 2021, Index of revisions to the 'Guidance on submissions' (2019/01), October 2020; [https://www.ref.ac.uk/media/1447/ref-2019\\_01-guidance-on-submissions.pdf](https://www.ref.ac.uk/media/1447/ref-2019_01-guidance-on-submissions.pdf)

20. Russell Group, Impact of Brexit on the technical workforce at Russell Group universities, 2017; <https://www.russellgroup.ac.uk/media/5571/impact-of-brexit-on-the-technical-workforce-september-2017-final.pdf>

FIGURE 8

Employment in higher education in technical roles by occupation, 2018/19.



## Regional

### National and Higher Education research and technical workforce

Regional employment in research roles (national) in absolute terms was highest in the South East of England and lowest in Northern Ireland throughout the period 2013/14 to 2018/19. In 2018/19, employment in research roles by region from largest to smallest was as follows: South East (England), 125,800; London, 90,300; North West (England), 89,400; East (England) 81,400; Scotland, 78,300; South West (England), 68,300; West Midlands (England), 64,400; Yorkshire and the Humber, 61,400; East Midlands (England), 51,700; Wales, 35,200; North East (England), 30,700; Northern Ireland, 20,900. For all six years, employment in research roles in higher education was highest in the London and lowest in Northern Ireland.

As with researchers, throughout the six years, the largest number of those in technical roles were employed in the South East while the lowest number were employed in Northern Ireland.

In 2018/19, employment in technical roles by region from largest to smallest was as follows: South East (England), 94,000; East (England) 76,800; North West (England), 70,400; London, 68,000; West Midlands (England), 64,700; East Midlands (England), 62,100; Scotland, 61,600; Yorkshire and the Humber, 58,600; South West (England), 58,000; Wales, 33,800; North East (England), 27,700; Northern Ireland, 15,800. For all six years, as with research roles, employment in technical roles in higher education in absolute terms was highest in the London and lowest in Northern Ireland.

The data contained in Figure 9 are drawn from the Labour Force Survey and the Higher Education Statistics Agency Staff record. The Labour Force Survey uses sample data. With regard to Figure 9, there are several incidences where the constituent data are based on small sample sizes and so the estimate should be treated with some caution. For example, it is important to note that in many instances over the six-year period, the number of environmental technicians in the sample is so low that an estimate has not been produced.

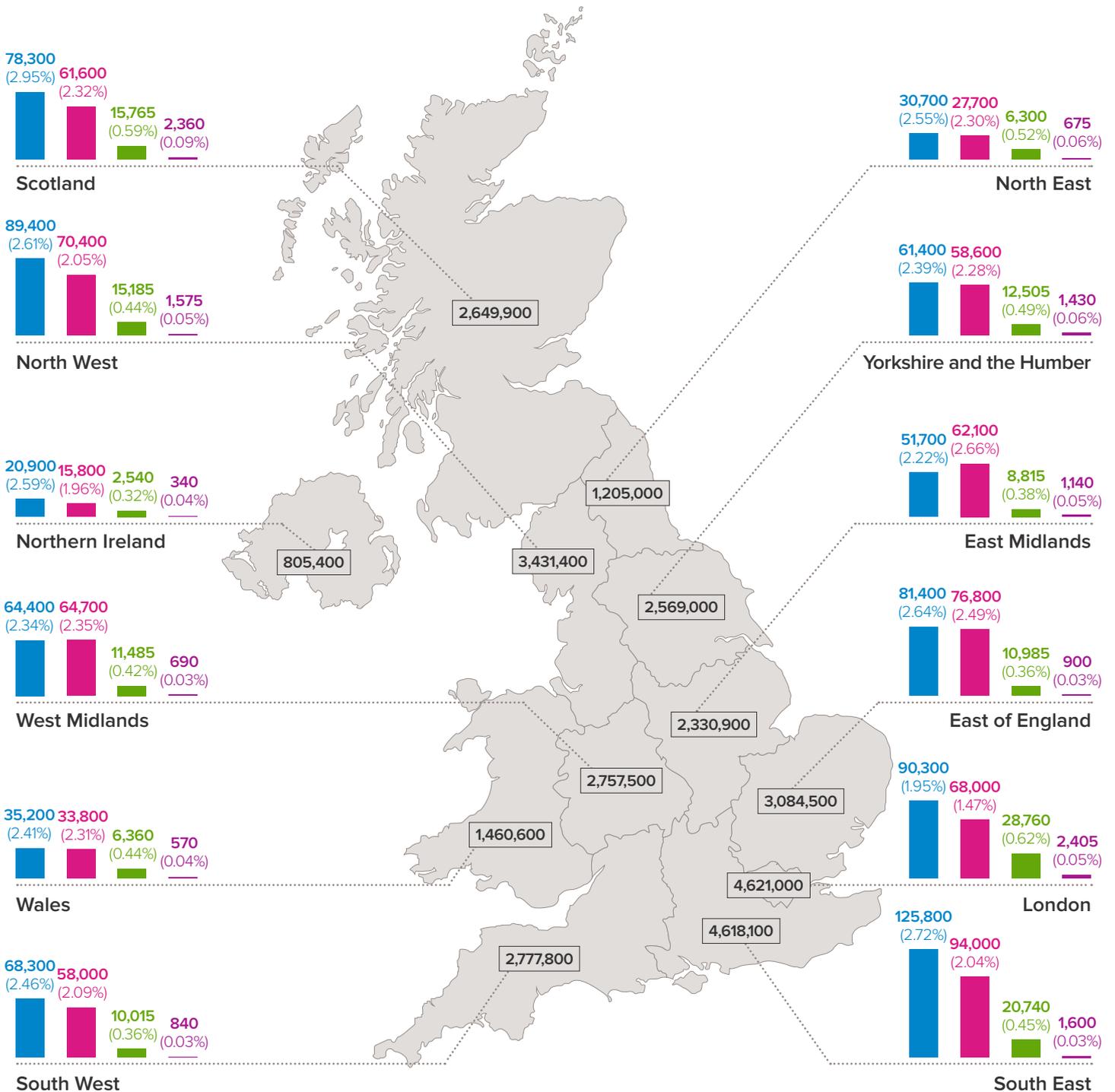
FIGURE 9

A map of employment in research and technical roles by region, 2018/19.

KEY

- National research roles
- National technical roles
- Higher education research roles
- Higher education technical roles

**12,345** = Total research and technical roles within each region  
 (1.23%) = Percentage of total workforce per region  
**1,234,567** = Total workforce per region



## Age

### National research and technical workforce

As Figures 10 and 11 show, the greatest proportion of both the national research and technical workforces are between the ages of 25 to 49, followed by those aged 50 to 64, 16 to 24 and 65 and over. This is true for all six years. This is broadly consistent with the national workforce, though the relative proportions differ. For example, in 2018/19, 56.33% of the national workforce were aged between 25 and 49, 28.20% between 50 and 64, 11.51% between 16 and 24, and 3.96% aged 65 and over. In 2018/19, of the research workforce, 65.44% were aged between 25 and 49, 24.54% between 50 and 64, 7.11% between 16 and 24, and 2.95% 65 and over. For the same year, 59.27% of the technical workforce were between 25 and 49, 27.35% between 50 and 64, 10.72% between 16 and 24, and 2.60% were 65 and over. Figures 12 and 13 illustrate that there is some variation by occupation in both the national research and technical workforces.

The data contained within Figures 10 to 13 are taken from the Labour Force Survey. In some instances, it has either not been possible to generate an estimate or the estimate that has been generated is less precise. In the context of the research workforce, this applies to research and development managers. While for the technical workforce, this applies to environmental technicians. This is evident in Figures 12 and 13 respectively where there is no estimate for the number of research and development managers aged 16 to 24, or environmental technicians, aged 16 to 24, and 65 and over. Where there is no estimate this has been recorded as zero. Consequently, both the overall figures and specific figures for ages 16 to 24 and 65 and over are likely to underestimate the number of people of these ages employed in research and technical roles in the national workforce.

FIGURE 10

Employment in the national workforce in research roles by age, 2013/14 – 2018/19.

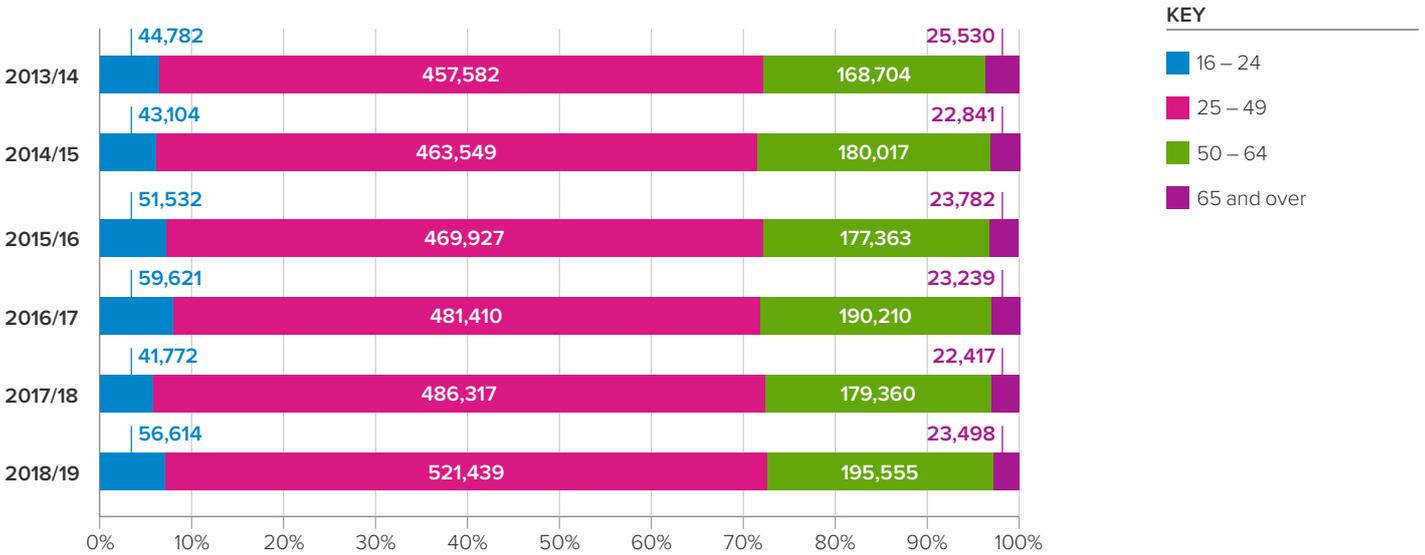


FIGURE 11

Employment in the national workforce in technical roles by age, 2013/14 – 2018/19.

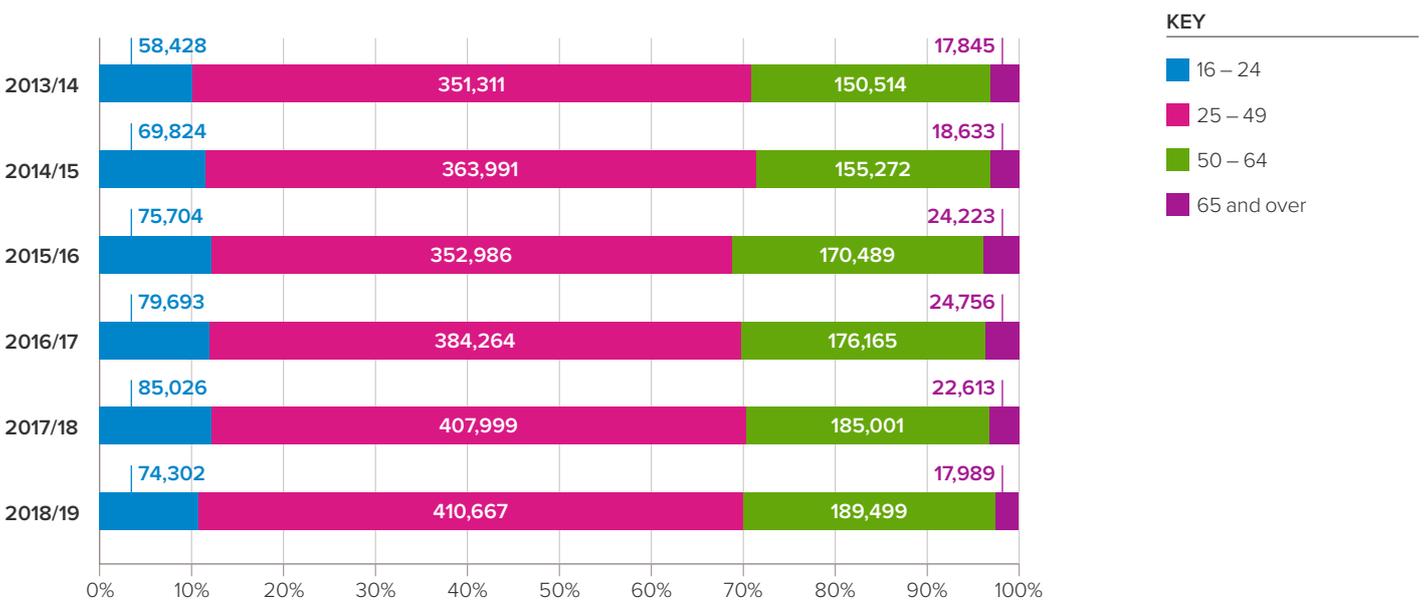


FIGURE 12

Employment in the national workforce in research roles by occupation and age, 2018/19.

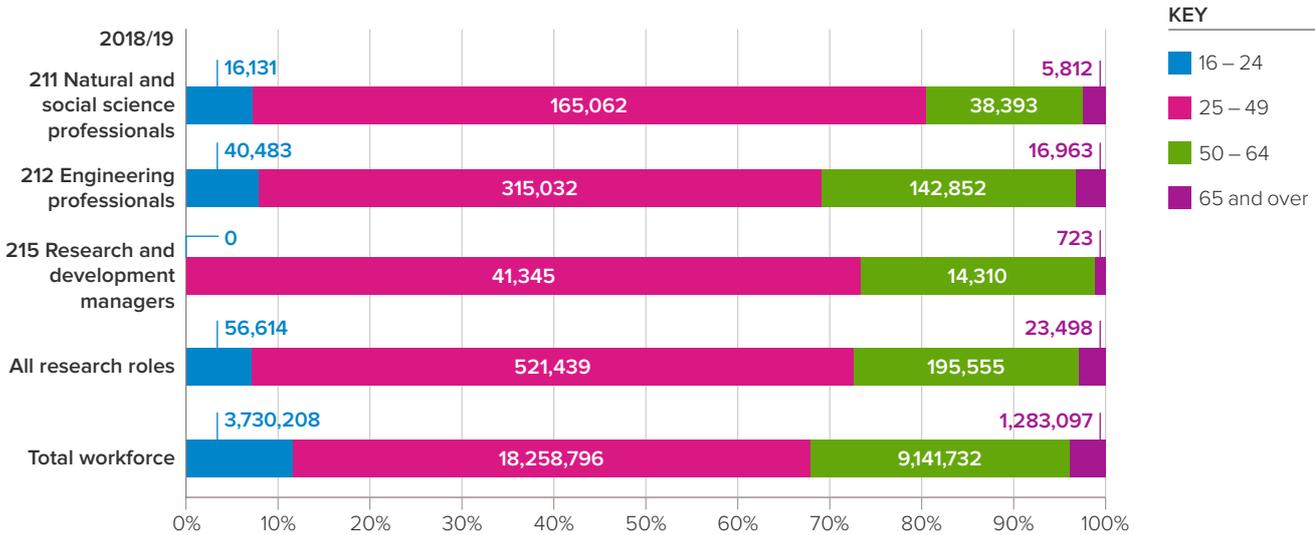
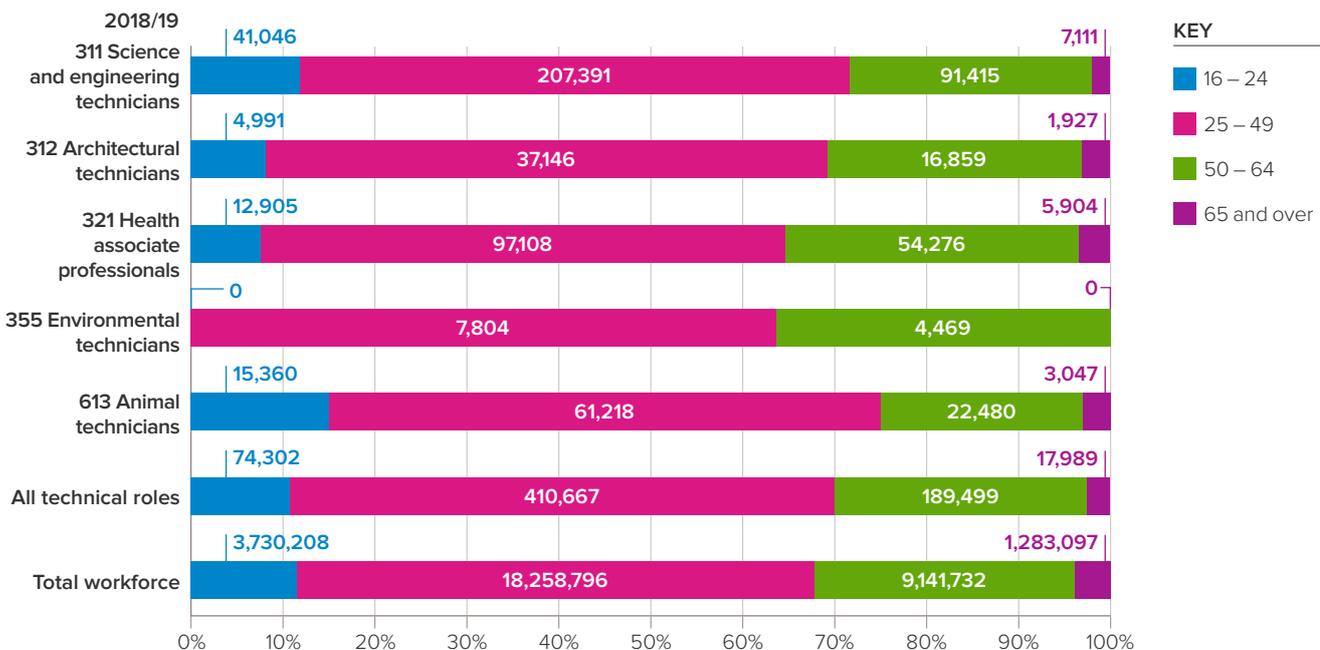


FIGURE 13

Employment in the national workforce in technical roles by occupation and age, 2018/19.



### Higher education research and technical workforce

The age ranges used within the Higher Education Statistics Agency Staff record differ from those within the Labour Force Survey, and so it is not possible to directly compare the age profile of the higher education workforce with that of the national workforce for all age groups.

Over the six years, for all research roles in higher education, the age profile is broadly consistent. On average 25.54% of staff were 34 and under, 43.01% were between 35 and 49, 29.08% were between 50 and 65 and 2.38% were 66 and over. In 2018/19, 25.36% of those in research roles in higher education were 34 and under, 43.29% were between 35 and 49, 28.65% were between 50 and 65, 2.70% were 66 and over.

For the technical workforce, there is a slight shift over the six years, as the proportion of those aged 34 and under has increased. In 2013/14, 31.99% were aged 34 and under, 33.30% were aged between 35 and 49, 33.82% were aged between 50 and 65, and 0.92% were 66 and older. By 2018/19, the proportion of those aged 34 and under had risen to 35.54%, 32.61% were aged between 35 and 49, 30.34% were aged between 50 and 65, and 1.48% were 66 and older. In comparison with the national technical workforce, a higher proportion of those employed in technical roles in higher education were between the ages of 50 and 65.

Figures 16 and 17 contain more granular data for the research workforce. Figure 16 illustrates that, in comparison to both the national research workforce and the total number of those employed in research roles in universities in 2018/19, a much higher proportion (54.90%) of those on temporary contracts are aged 34 and under. While temporary research staff, made up only 28.30% of the research workforce in 2018/19, temporary research staff under 34 accounted for 61.26% of the total higher education research workforce under 34. Correspondingly, a higher proportion of those on permanent contracts in 2018/19 were aged between 35 and 49 (47.05%), and 50 to 65 (36.38%). Figure 17 illustrates that the age profile for those employed as professors skews older than that for all research staff. Notably, in 2018/19 while professors made up only 13.96% of research workforce in higher education, they accounted for 56.11% of those over 65. Conversely, the age profile for research assistants skews younger: 66.96% are 34 and under in 2018/19.

As Figure 18 shows, the preponderance of science and engineering technicians among technical staff within higher education establishes the age profile of that group as the norm. The age profiles for architectural technicians and environmental technicians appear to deviate from this, though this is perhaps exaggerated due to the small numbers of people employed in these roles. More significant is the difference in the age profile for those employed as animal technicians, 56.06% of whom were 34 and under in 2018/19.

FIGURE 14

Employment in research roles in higher education by age, 2013/14 – 2018/19.

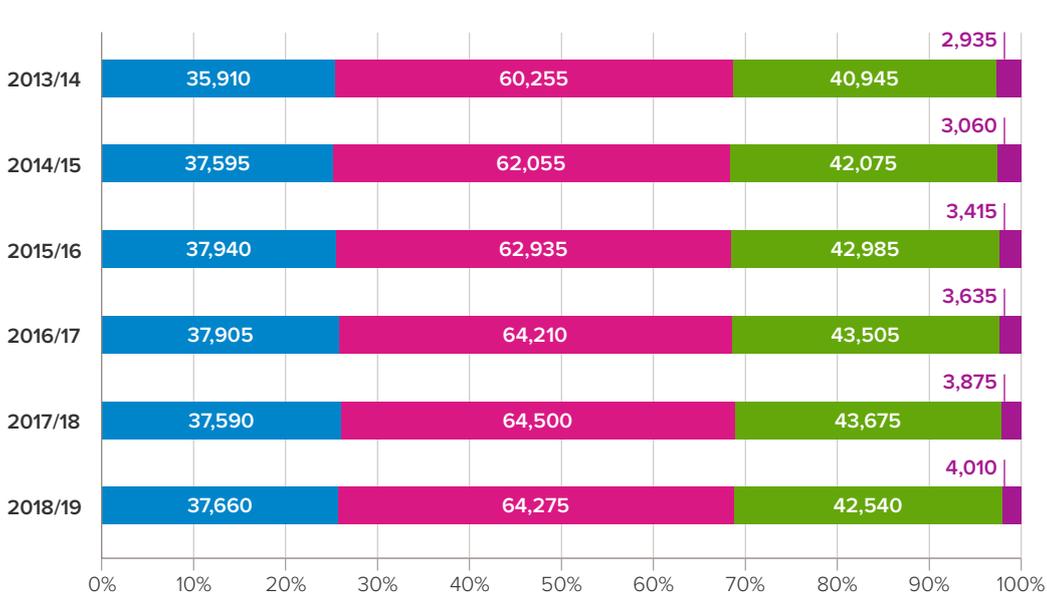


FIGURE 15

Employment in technical roles in higher education by age, 2013/14 – 2018/19.

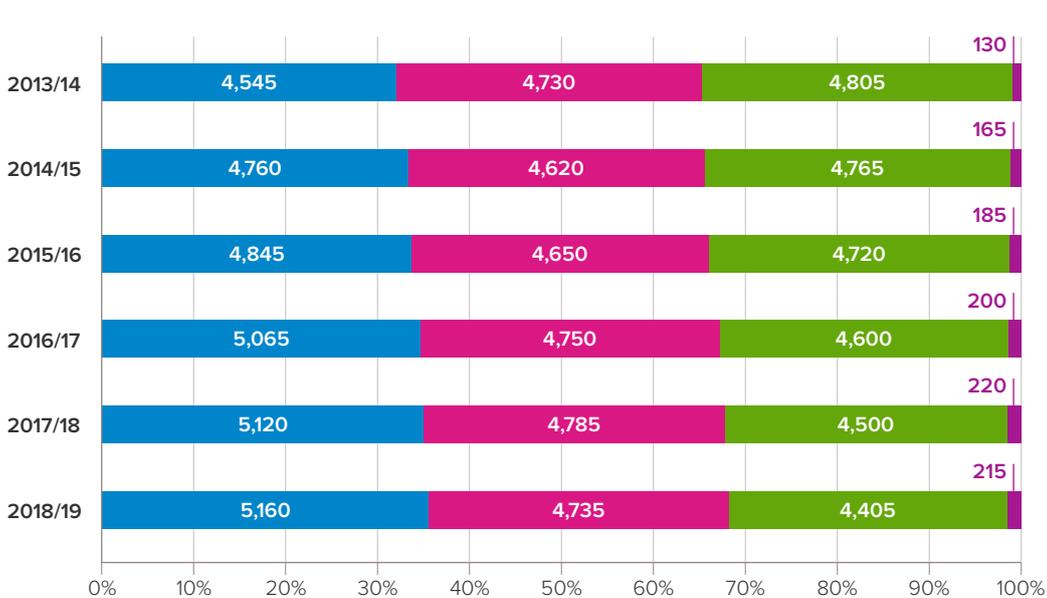


FIGURE 16

Employment in in higher education permanent and temporary research roles by age, 2018/19.

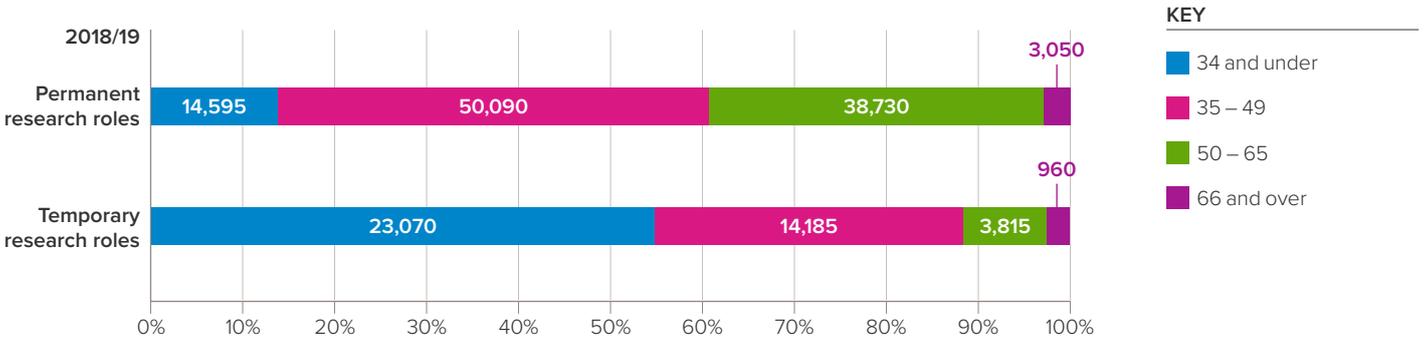


FIGURE 17

Employment in higher education in research occupation by age, 2018/19.

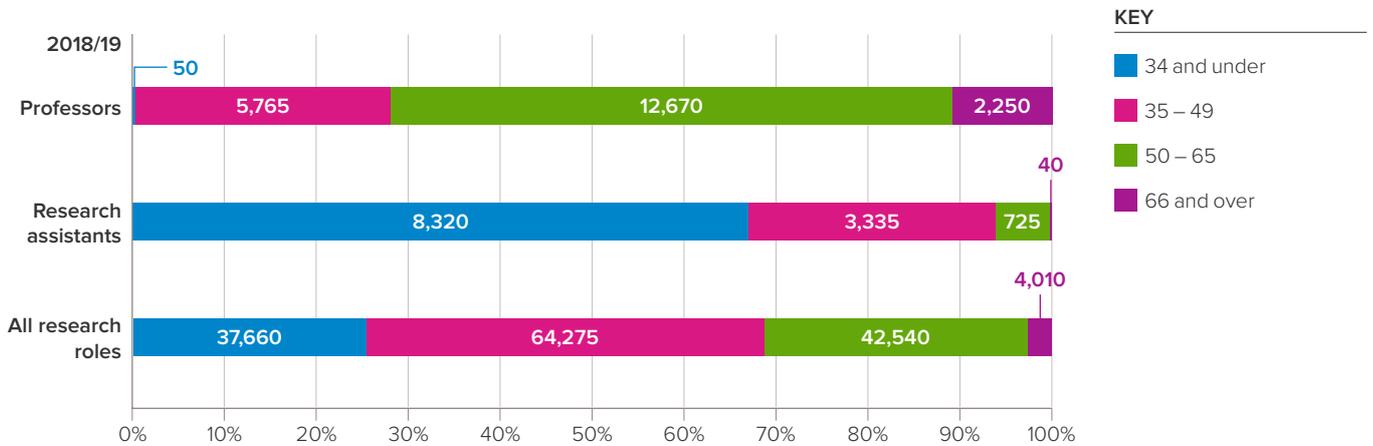
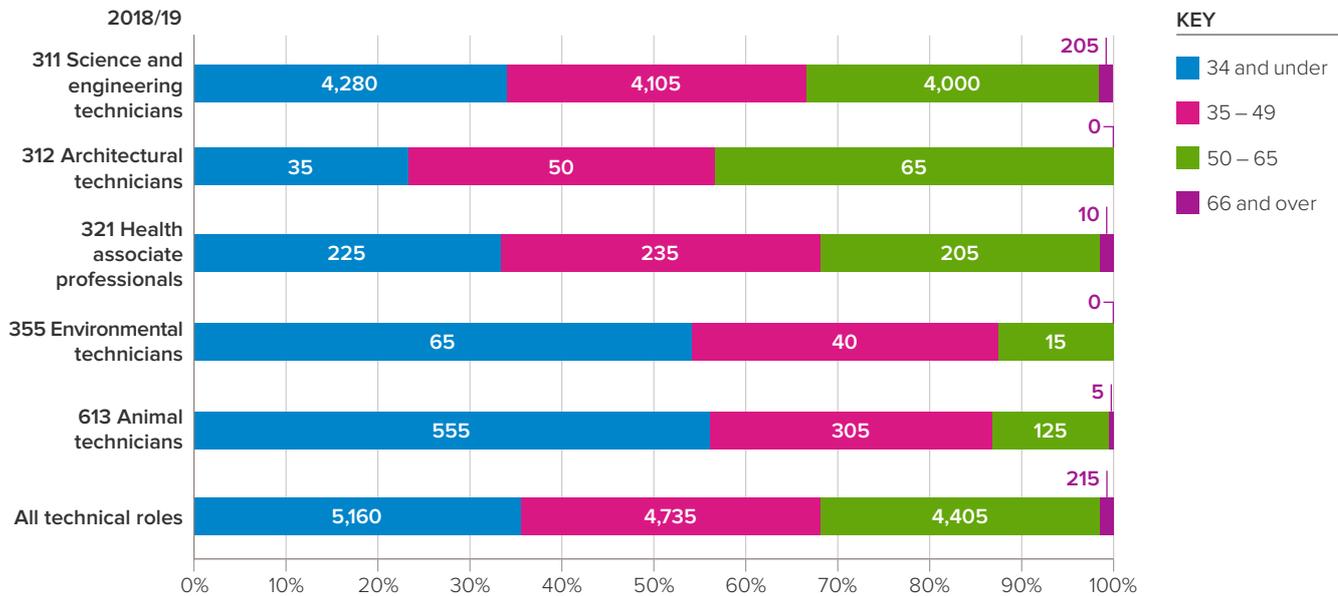


FIGURE 18

Employment in higher education in technical occupation by age, 2018/19.



## Sex

### National research and technical workforce

Over the six years, a higher proportion of both those employed in research and technical roles were recorded as male in comparison with the overall workforce. The difference is particularly marked in the research workforce. For example, in 2018/19, 47.21% of the national workforce were female and 52.79% were male, while 22.61% of the research workforce were female and 77.51% male. In 2018/19, 43.17% of the technical workforce were female and 56.83% were male.

Figures 19 to 22 represent data taken from the Labour Force Survey. Sex data are collected for female and male, no further data regarding sex status or gender identity are collected. For the national technical workforce, due to sample size, in some incidences, the estimates for environmental technicians are less likely to be precise and should be treated with some degree of caution.

Figures 21 and 22 illustrate that there is considerable variation in the proportions of female and male employment in different types of research and technical roles at the occupational level in 2018/19. While a higher proportion of those in all research occupations are male, as with the national workforce, this varies from 51.68% for natural and social science professionals to 90.42% for engineering professionals. These proportions broadly hold over the six years. There is greater variation at the occupation level for the technical workforce. In 2018/19, a majority of animal care and control services and health associate professionals were female: 77.67% and 72.23% respectively. As with the research workforce, the occupational profiles by sex are broadly consistent over the six years.

FIGURE 19

Employment in the national workforce in research roles by sex, 2013/14 – 2018/19.



FIGURE 20

Employment in the national workforce in technical roles by sex, 2013/14 – 2018/19.

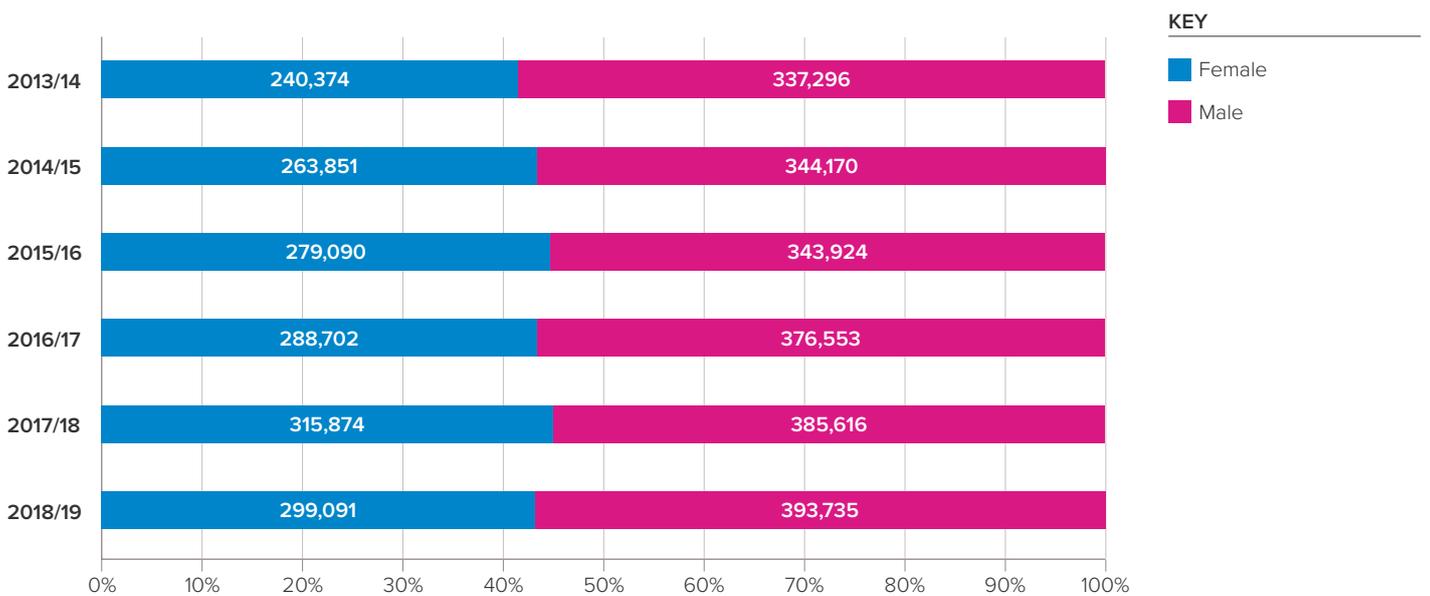


FIGURE 21

Employment in the national workforce in research roles by occupation by sex, 2018/19.

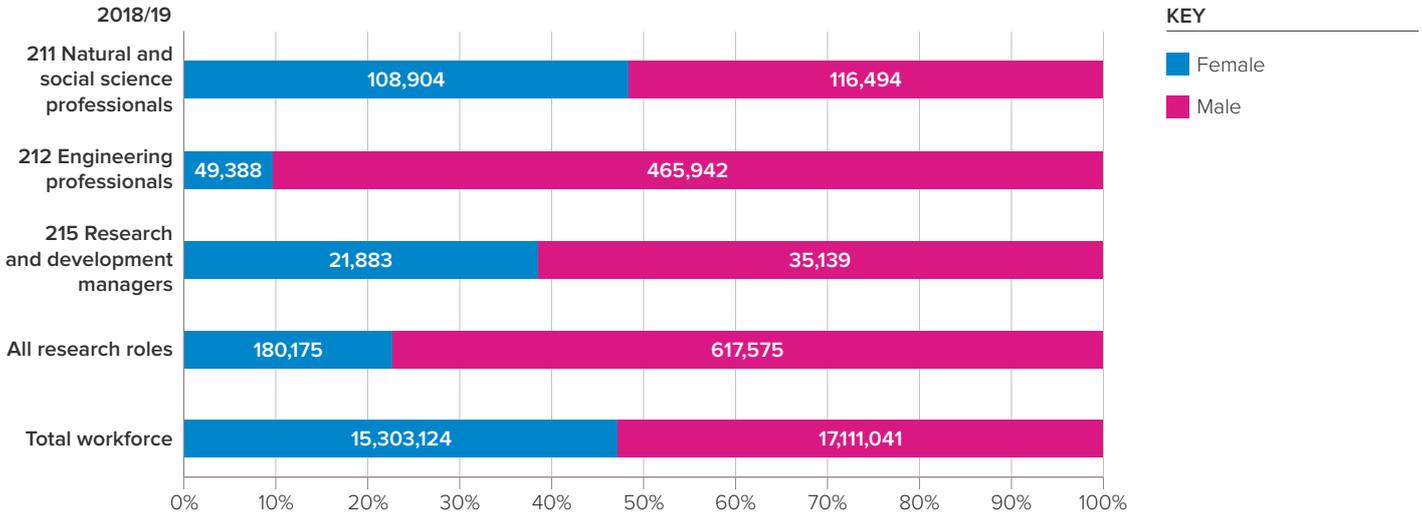
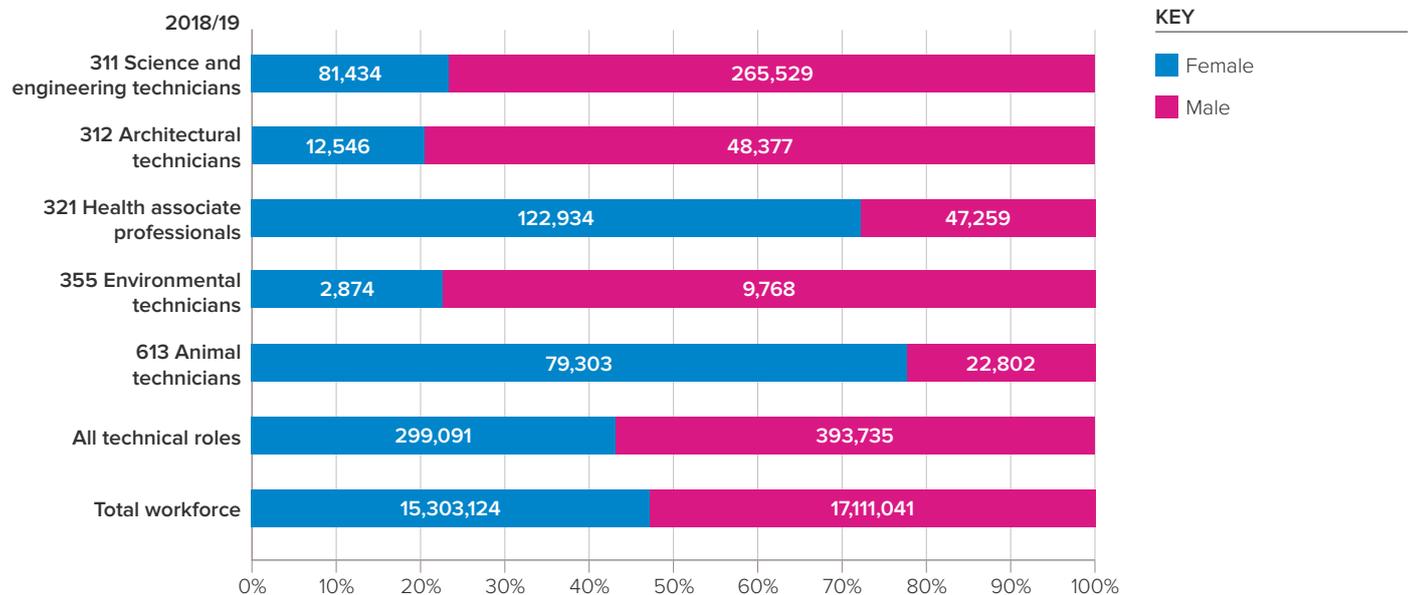


FIGURE 22

Employment in the national workforce in technical roles by occupation by sex, 2018/19.



### Higher education research and technical workforce

The data contained in Figures 23 to 27 are taken from the Higher Education Statistics Agency Staff record. Notes on the definition are reproduced below:

“This field records the sex of the member of staff, as opposed to the gender with which they identify.

Other is included for staff whose sex aligns with terms such as intersex, androgyne, intergender, ambigender, gender fluid, polygender and gender queer.”<sup>21</sup>

Other has been an option since 2017/18, and so data are not available for this for 2013/14, 2014/15, 2015/16, and 2016/17. In Figures 23 and 24 below, the other category is included with a figure of zero for these years. Consequently, the number of those with the sex other as defined above in these years may be an underestimate. As this category is not included in the national workforce data, it is not possible to compare the proportion of those with the sex other employed in higher education with the national workforce.

Figures 23 and 24 show that while the proportion of male and female staff employed in both research and technical roles in higher education has been relatively stable, the proportion of staff recorded as female has increased slightly. The proportion of female staff employed in research roles has risen from 41.75% in 2013/14 to 43.46% in 2018/19. The proportion of female staff employed in technical roles has risen from 41.67% in 2013/14 to 44.11% to 2018/19.

The number of staff employed in research roles in higher education with the recorded sex other was 0.03% in 2018/19. In absolute terms, the number of research staff with the recorded sex other has risen from 30 in 2017/18 to 40 in 2018/19.

The number of staff employed in technical roles in higher education with the recorded sex other was 0.03% of the technical workforce in 2018/19.

21. HESA, Definitions: Staff, accessed 24 November 2020; <https://www.hesa.ac.uk/support/definitions/staff>

FIGURE 23

Employment in the higher education workforce in research roles by sex, 2013/14 – 2018/19.

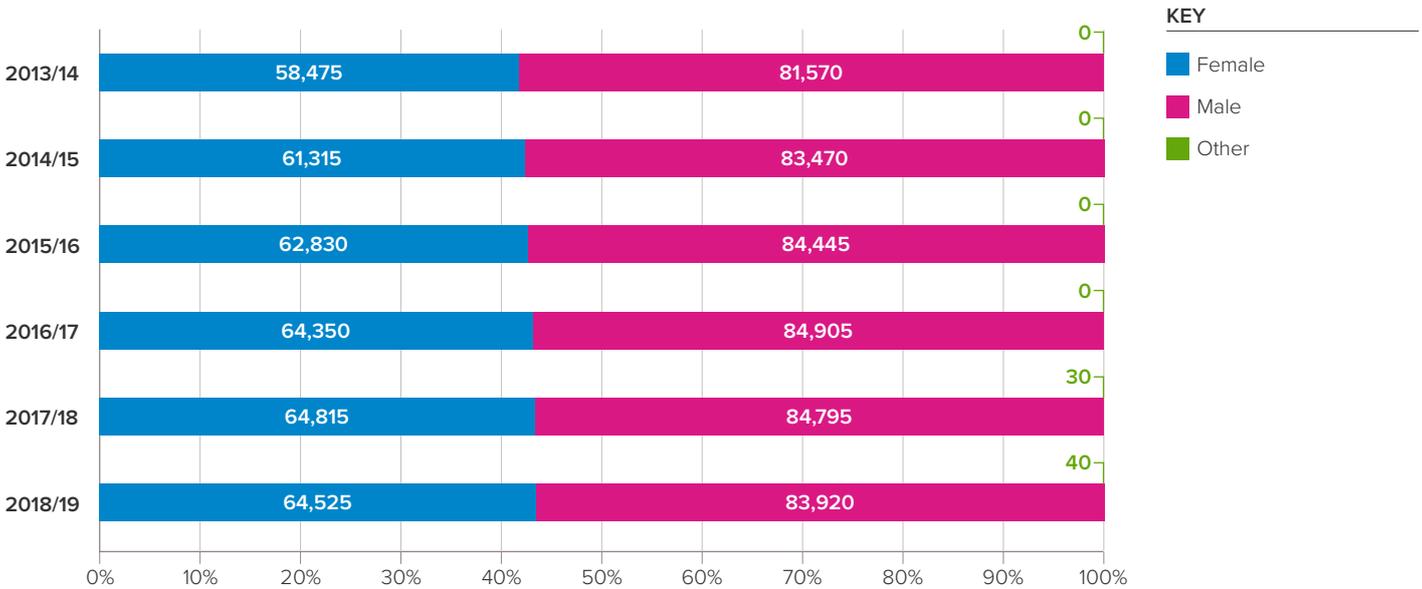


FIGURE 24

Employment in the higher education workforce in technical roles by sex, 2013/14 – 2018/19.

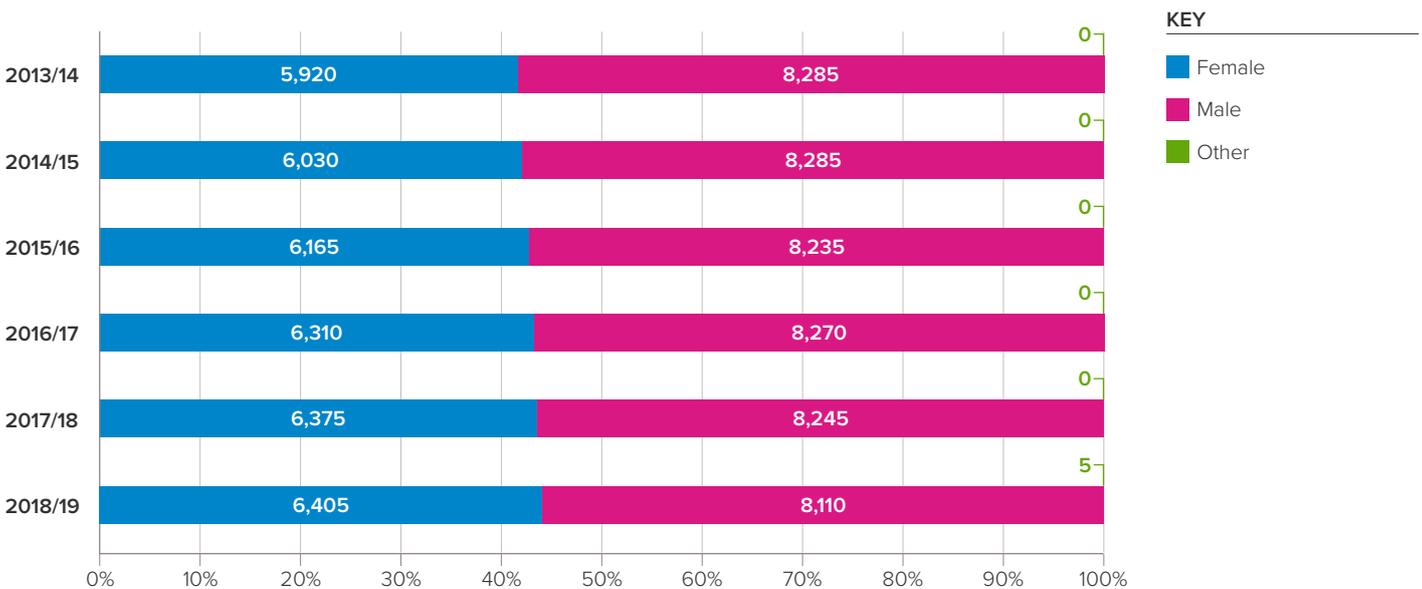


Figure 25 shows some difference between the sex profiles for permanent and temporary research staff in 2018/19. 42.34% of research staff on permanent contracts are recorded as female. 46.29% of research staff on temporary contracts are recorded as female. The percentage of staff with the recorded sex other is comparable for permanent research staff (0.03%) and temporary research staff (0.02%). For all six years, there have been a higher proportion of research staff with the recorded sex female on temporary contracts than permanent contracts.

As Figure 26 illustrates, there is considerable variation within roles. In 2018/19, 73.64% of those employed as professors were recorded as male. Conversely, 48.37% of those employed as research assistants were recorded as male. There has been a slight rise in the proportion of those employed as professors recorded as female, from 21.99% in 2013/14 to 26.36% in 2018/19. No staff employed in this role were recorded with the sex other. The proportion of those employed as research assistants with the recorded sex female has also risen over this six-year period, though by a lesser amount: from 50.55% in 2013/14 to 51.63% in 2018/19.

Figure 27 illustrates considerable variation in the sex profile of those employed in technical roles in higher education at an occupational level. As with the national workforce, the majority of those employed in higher education in 2018/19 as animal technicians and health associate professionals have the recorded sex female: 74.11% and 59.26%. In contrast to the national workforce, a higher proportion of those employed as environmental technicians in higher education in 2018/19 were recorded as female: 54.17%.

FIGURE 25

Employment in the higher education workforce in permanent and temporary research roles by sex, 2018/19.

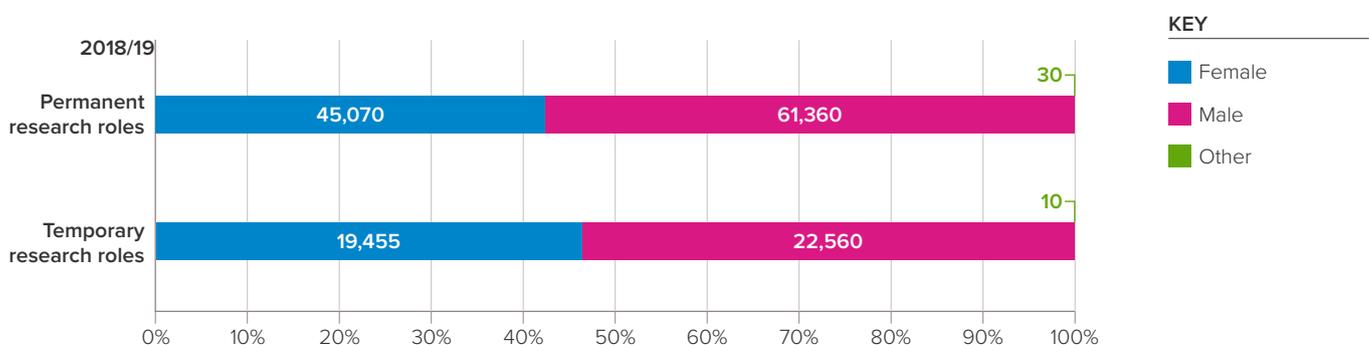


FIGURE 26

Employment in the higher education workforce by contract level, 2018/19.

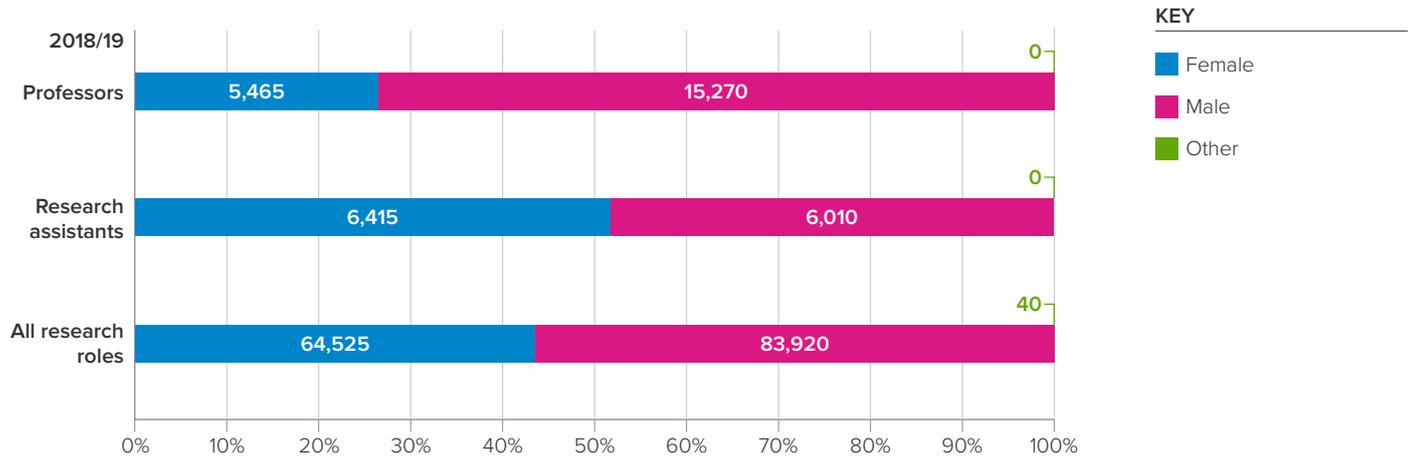
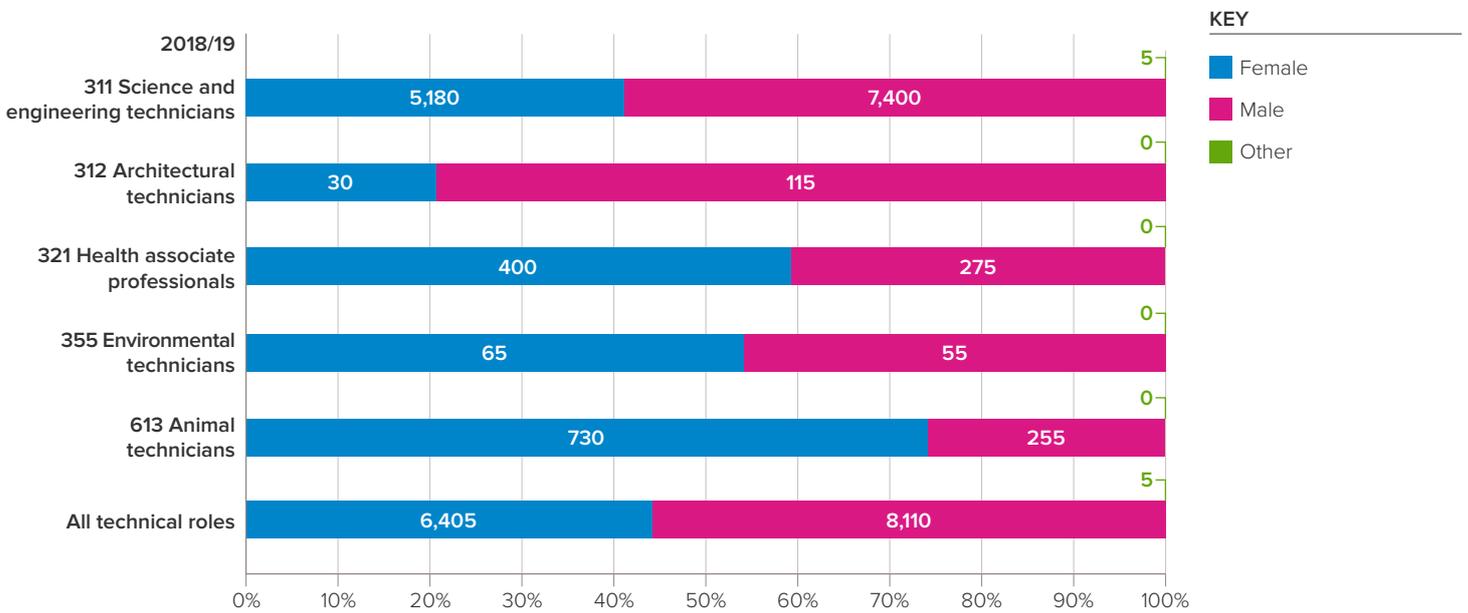


FIGURE 27

Employment in the higher education workforce in technical roles by occupation, 2018/19.



# Annex

## Profile of the UK research and technical workforce

# Annex A – National workforce data: Description and definitions

## Description

This report contains an overview of the size and composition of the research and technical workforce. Data are presented for the following time periods: October – September 2013/14; October – September 2014/15; October – September 2015/16; October – September 2016/17; October – September 2017/18; October – September 2018/19.

## Definitions

### Approach

In order to produce this report, it was necessary to define which occupations should be included as ‘research’ and ‘technical’ roles respectively. The Labour Force Survey categorises occupations using the taxonomy set out in the 2010 Standard Occupation Classification (SOC)<sup>22</sup>. A revised classification was published in 2020. Further information is available on the Office for National Statistics website. The categorisation used in this report is set out in Table 1.

**TABLE 1**

UK research, technical and teaching workforce occupation categorisation. An expanded table with the SOC code description and included unit follows.

Occupation type	SOC code/s included (Minor group)
<b>Research</b>	211 Natural and social science professionals
	212 Engineering professionals
	215 Research and development managers
<b>Technical</b>	311 Science and engineering technicians
	312 Architectural technicians
	321 Health associate professionals
	355 Environmental technicians
	613 Animal technicians

22. ONS, SOC 2010, accessed 24 November; <https://www.ons.gov.uk/methodology/classificationsandstandards/standardoccupationalclassificationsoc/soc2010>

TABLE 2

Expanded UK research technical workforce occupation classification.

Occupation type	SOC code/s included (Minor group)	SOC code description and included unit groups <sup>23</sup>
Research	211 Natural and social science professionals	<p>Natural and social science professionals are involved in planning, directing and undertaking research across all of the natural sciences and in the social sciences which encompasses the humanities.</p> <p>Occupations in this minor group are classified into the following unit groups:</p> <ul style="list-style-type: none"> <li>• 2111 Chemical scientists</li> <li>• 2112 Biological scientists and biochemists</li> <li>• 2113 Physical scientists</li> <li>• 2114 Social and humanities scientists</li> <li>• 2119 Natural and social science professionals not elsewhere classified (N.E.C.)</li> </ul>
	212 Engineering professionals	<p>Engineering professionals plan, organise and technically supervise the construction, testing, installation and maintenance of mechanical, structural, chemical, electrical and electronic systems and equipment, advise and direct technical aspects of production programmes, and plan production schedules and work procedures to ensure efficiency and quality.</p> <p>Occupations in this minor group are classified into the following unit groups:</p> <ul style="list-style-type: none"> <li>• 2121 Civil engineers</li> <li>• 2122 Mechanical engineers</li> <li>• 2123 Electrical engineers</li> <li>• 2124 Electronics engineers</li> <li>• 2126 Design and development engineers</li> <li>• 2127 Production and process engineers</li> <li>• 2129 Engineering professionals N.E.C.</li> </ul>
	215 Research and development managers	<p>Jobholders in this unit group plan, organise, direct and advise on the research and development operations of an organisation.</p> <p>Occupations in this minor group are classified into the following unit group:</p> <ul style="list-style-type: none"> <li>• 2150 Research and development managers</li> </ul>

23. ONS, Standard Occupational Classification 2010: Volume 1 Structure and descriptions of unit groups, accessed 2 February 2021; <https://www.ons.gov.uk/methodology/classificationsandstandards/standardoccupationalclassificationsoc/soc2010/soc2010volume1structureanddescriptionsunitgroups>

TABLE 2 Continued

<b>Technical</b>	311 Science and engineering technicians	<p>Science, engineering and production technicians perform a variety of technical support functions to assist the work of scientists and technologists, assist in the design, development, production and maintenance of electronic systems, perform technical quality assurance related tasks, support the work of building and civil engineers, and perform various other technical support functions for engineers.</p> <p>Occupations in this minor group are classified into the following unit groups:</p> <ul style="list-style-type: none"> <li>• 3111 Laboratory technicians</li> <li>• 3112 Electrical and electronics technicians</li> <li>• 3113 Engineering technicians</li> <li>• 3114 Building and civil engineering technicians</li> <li>• 3115 Quality assurance technicians</li> <li>• 3116 Planning, process and production technicians</li> <li>• 3119 Science, engineering and production technicians N.E.C.</li> </ul>
	312 Architectural technicians	<p>Workers in this minor group prepare technical drawings, plans and charts and give technical assistance to planners and architects.</p> <p>Occupations in this minor group are classified into the following unit groups:</p> <ul style="list-style-type: none"> <li>• 3121 Architectural and town planning technicians</li> <li>• 3122 Draughtspersons</li> </ul>

TABLE 2 Continued

<b>Technical</b>	321 Health associate professionals	<p>Workers in this minor group provide a variety of technical support functions for a range of health professionals such as administering first aid treatment in emergencies, operating x-ray and other imaging equipment, fitting hearing aids and spectacles, dispensing medicines, and fitting, servicing and repairing medical and dental devices.</p> <p>Occupations in this minor group are classified into the following unit groups:</p> <ul style="list-style-type: none"> <li>• 3213 Paramedics</li> <li>• 3216 Dispensing opticians</li> <li>• 3217 Pharmaceutical technicians</li> <li>• 3218 Medical and dental technicians</li> <li>• 3219 Health associate professionals N.E.C.</li> </ul>
	355 Environmental technicians	<p>Workers in this minor group are responsible for the day-to-day planning, management, promotion and maintenance of areas of the environment that are of benefit to wildlife and the public.</p> <p>Occupations in this minor group are classified into the following unit groups:</p> <ul style="list-style-type: none"> <li>• 3550 Conservation and environmental associate professionals</li> </ul>
	613 Animal technicians	<p>Workers in this minor group provide assistance to veterinarians, carry out pest control services, care for animals in stables, kennels, zoos and other such establishments, provide specialised grooming and clipping services for animals and capture stray or unruly dogs.</p> <p>Occupations in this minor group are classified into the following unit groups:</p> <ul style="list-style-type: none"> <li>• 6131 Veterinary nurses</li> <li>• 6132 Pest control officers</li> <li>• 6139 Animal care services occupations N.E.C.</li> </ul>

### Rationale

This categorisation in Table 1 was selected following discussion with other organisations working on research and development. Some effort has been made to achieve consistency, though it is expected that others may take different approaches and so, for transparency, the report retains the figures for the individual SOC codes. The 'minor group' three-digit SOC codes were used as they appeared to offer the best balance between granularity of description and sample size.

### Limitations

The data from the Labour Force Survey are estimates. In some instances, particularly when looking at the specific characteristics, the estimate is unreliable, or no estimate has been produced due to the sample size. Additionally, the categorisation that has been used (described in Table 2) is an approximation. It is likely that there may be some people working in research and technical roles that are not captured within this. Conversely, given the breadth of potential occupations included within each group there will also be people that are captured that are not working in research or technical roles.

# Annex B – Higher education workforce data: Description and definitions

## Description

This section of the report contains an overview of the size and composition of the research and technical workforce within higher education institutions. Data are presented for the following time periods: August – July 2013/14; August – July 2014/15; August – July 2015/16; August – July 2016/17; August – July 2017/18; August – July 2018/19.

## Definitions

### Approach

The categories of staff included in this report are described below in Table 3. In all cases the full person equivalent (FPE) data has been used<sup>24</sup>.

**TABLE 3**

UK higher education research, technical and teaching workforce categorisation.

Occupation type	Occupation description	HESA classification
<b>Research</b>	–	‘Academic employment function’: ‘Research only’ and ‘Teaching & research’
	Temporary research staff	‘Terms of Employment’: Fixed-term ‘Academic employment function’: ‘Research only’ and ‘Teaching & research’
	Permanent research staff	‘Terms of Employment’: ‘Open-ended/ Permanent’ ‘Academic employment function’: ‘Research only’ and ‘Teaching & research’
	Professor	‘Academic employment function’: ‘Research only’ and ‘Teaching & research’ ‘Contract level’: ‘Professor’
	Research assistant	‘Academic employment function’: ‘Research only’ and ‘Teaching & research’ ‘Contract level’: L0 Senior Administrative staff (Professional/ technical) Research assistant, Teaching assistant’
<b>Technical</b>	Technician	‘Academic employment marker: ‘Non-academic’ ‘Activity Standard Occupational Classification (SOC): ‘311 Science and engineering technicians’, ‘312 Architectural technicians’, ‘321 Health associate professionals’, ‘355 Environmental technicians’ and ‘613 Animal technicians’

24. HESA, Definitions: Staff webpage, accessed 2 February 2021; <https://www.hesa.ac.uk/support/definitions/staff>

### Rationale

This report looks at the total research and technician professional workforce within higher education institutions. Additionally, within the research population it looks at temporary and permanent staff, as well as professorial staff, research assistant staff and all other research staff. The purpose of this is to understand, in the context of the future workforce, how the characteristics of these groups differ between one another and over time.

### Limitations

To identify research assistants, the 'Research only' and 'Teaching & research' staff population has been filtered by the 'Contract level' 'LO Senior Administrative staff (Professional/technical) Research assistant, Teaching assistant' level. Other levels also include research assistants, for example 'K0 Senior Professional (Technical). However, this also includes Lecturer, Research fellow, Researcher (senior research assistant), Teaching fellow' and so has not been included.





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**For further information**

The Royal Society  
6 – 9 Carlton House Terrace  
London SW1Y 5AG

T +44 20 7451 2500

E [science.policy@royalsociety.org](mailto:science.policy@royalsociety.org)

W [royalsociety.org](http://royalsociety.org)

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