CRAC
The Career Development Organisation

The profile of postdoctoral researchers in the UK eligible for Royal Society early career fellowship programmes

Report for the Royal Society by the Careers Research & Advisory Centre (CRAC)

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vitae
realising the potential of researchers

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Careers Research & Advisory Centre (CRAC) Ltd
22 Signet Court
Cambridge
CB5 8LA

www.crac.org.uk
www.vitae.ac.uk

Contact:
Robin Mellors-Bourne, Director of Research & Intelligence
robin.mellors-bourne@crac.org.uk

About us

The Careers Research & Advisory Centre (CRAC) provides research, intelligence and innovation services for all those who support the career development of people of all ages and in all sectors. CRAC works in partnership with government agencies, education organisations and providers and employers and professional bodies. CRAC is a registered charity No 313164 established in 1964.

CRAC's research and consultancy work focuses on career-related learning, employability development and career transitions, including STEM and researcher careers.
Vitae is a non-profit programme, part of CRAC, with over 50 years' experience of enhancing the skills of researchers. Vitae strengthens members' institutional provision for the professional development of researchers through research and innovation, training and resources, events, consultancy and membership.

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1. Executive summary

The principal aim of this project was to establish the diversity profile of postdoctoral researchers in the UK eligible for the Royal Society's fellowship programmes that support early-career scientists to transition to independent research leadership in the UK. Assessment of diversity data collected about applicants for these awards and awardees against this benchmark will indicate whether or not Royal Society (RS) award-making reflects the diversity of the pool of postdoctoral researchers eligible for the awards.

The Higher Education Statistics Agency's (HESA) Staff Record data are by far the most systematic data available about staff in UK higher education (HE). To model the profile of researchers who fulfil award eligibility criteria, staff data were filtered using certain specific data items while proxies were used to map other data items to aspects of eligibility. Used together, these filters produced a series of profiles which reveal the key diversity characteristics of the postdoctoral researchers eligible for fellowships.

The assumptions made and choice of these proxies are documented in this report. Of particular note is our choice not to adopt the approximation made by others in the sector that the population of postdoctoral researchers is those with a 'research only' employment contract. Such a strategy would overestimate the population in one respect but underestimate it in another. Instead we pursued a different and novel approach using a combination of existing employment-related data items.

The core profile of postdoctoral researchers is for 2018/19 (the most recent year for which HESA data are available) across the RS remit in terms of natural science subjects. Similar profiles for a sample of previous years enables documentation of changes in this profile with time. Profiles for some key subject groups, and some individual subjects, highlight differences in diversity profiles of postdoctoral scientists in those groupings and their changes over time.

The datasets have been provided to RS staff so that further profiles can be developed for sub-groups of interest, and/or further enhancement of the profiling method undertaken.

1.1. Emerging findings and issues

The key aspects of the core RS remit profile for 2018/19 include the following, with an indication of how they have changed over the last five years (based on profiles for 2017/18, 2015/16 and 2013/14, for which there are fully comparable data). For the pool of these 'eligible researchers':

- The size of the population has risen over the last five years (by c.10%) to 13,405;
- 42% are female, a proportion which has remained essentially steady during this time, but which masks lower proportions in physical sciences and engineering and higher in biomedical and biological sciences, but also different gender profiles with nationality;
- 38% are of UK nationality, 29% EU nationalities and 32% other nationalities ('non-EU'). The proportion of UK nationality has fallen over five years (from 46%) while those of non-EU nationality have risen from a quarter to almost a third during that time;
- 13% of UK nationals of known ethnicity are of minority ethnic group backgrounds, mostly of Asian background and only just over 1% Black background. Although this aggregate proportion has risen slightly over time, the number of individuals of minority ethnic background has remained static as the proportion of researchers of UK nationality falls;

- A much higher proportion (almost 29%) is of minority ethnic background when all nationalities are considered together, rising with the increase in researchers of non-EU nationality, particularly driven by males of Asian origin. However, the total with a Black background remains a lowly 2% even within this larger aggregate;
- Around 3% disclosed a disability, although this has risen from about 2.5% five years ago, chiefly through slightly more declaring mental health conditions or a cognitive or learning difference, whereas physical or medical conditions have not increased;
- 72% work in a Russell Group member institution, a proportion which has risen slightly, and 85% at an institution in England;
- Only 13% work part-time (although the rate for women at 20% is double that for men).

The subject-based profiles developed for 2018/19 show that a number of aspects of the diversity profile vary with subject. Comparison of this range of profiles:

- Confirms that the proportion of women researchers in the RS 'A' subjects (physical sciences, engineering, maths, computing) at 27% is substantially lower than in the 'B' subjects (57%), and lowest in the subjects of engineering and physics (both 23%). Detailed analysis suggests the proportion of UK researchers that is female is actually falling;
- Reveals strong variations in nationality, with a lower proportion of UK nationality in the A subjects (31%) than B subjects (45%), partly driven by higher proportions of researchers of non-EU nationality in subjects like engineering (where they are the majority, while UK nationals comprise only one quarter);
- Indicates complex variations in relation to the ethnicity of researchers of UK nationality: minority ethnic representation is lowest in physics (7%) and highest in engineering (18%);
- Highlights that the proportion of Black researchers (of UK nationality) in the physics or chemistry profiles in 2018/19 is zero (literally 1 or 2 individuals), and only 2% in engineering;
- In contrast, identifies much higher proportions of certain ethnic backgrounds in some subjects when all nationalities are considered – most particularly engineering, where minority ethnic researchers outnumber white, driven by a high and rising proportion of Asian background of non-EU nationalities. The proportion of Black researchers, however, does not increase substantially when all nationalities are considered, remaining below 1% in physics and highest in engineering at 3%;
- Suggests that in relation to several other aspects of diversity (age, disability, institutional type, extent of part-time working), the B-side subjects (biological and biomedical sciences) generally appear 'more diverse' than the A-side (engineering and the physical sciences).

Such analysis reveals strong intersectionalities between certain characteristics, and we highlight these in relation to gender and nationality. One of the most striking is the impact on the profiles of the increasing proportion of researchers of non-EU nationality. Most of this rising proportion are men of Asian background, increasing the total ethnic diversity but offsetting any approach to gender balance, while very few of them declare disability or work part-time.

Interesting issues emerge around ethnicity of the workforce in the light of its increasing internationality. While the increase in men, especially, of non-EU nationalities has driven a strong rise in the total proportion of Asian background, it has had little effect on the very low

proportion of Black origin. This means there remain very few Black role models, of any nationality, despite the changing overall ethnic mix, and this may continue to deter young Black scientists entering the academic workforce. Equally, it begs the question of what ethnicity data to record – the focus has historically been on ethnicity of UK nationals, but this segment comprises under 40% of the eligible researchers (and for engineering under one quarter). Whom exactly to monitor and using what ethnicity categories become pressing questions.

1.2. Recommendations

- The profiles in this report should be valuable when used as a benchmark with which to assess the diversity profiles of applicants for RS early-career awards and of successful awardees; we are aware the RS will be publishing the results of these comparisons and strongly encourage other funders to follow suit;
- In the absence of direct identification of postdoctoral researchers from current HESA staff data, analysis and comparison of data about eligible researchers would be improved and more robust with some enhancements to the data collected by HESA. We recommend discussion with HESA about possibilities for more specific data collection, for example adjustment of the existing but little used current 'Research Assistant' field (with suitable amendment to definitions and terminology) as a means to identify this population;
- It would additionally (or alternatively) be valuable for the sector to agree any specific additional data to be sought through HESA about early-career researchers, including items such as year of doctoral qualification or prior employment details. This would enable more robust information about postdoctoral researchers and their career paths and trajectories, for monitoring not only of diversity but also relating to implementation of the various Concordats that now exist for the research workforce;
- The sector needs to review how ethnicity is considered, monitored and reported in the light of the increasingly international composition of the workforce, in order to underpin with consistent data the efforts being made to counter under-representation of ethnic minorities in the UK academic workforce (an under-representation that continues, in these data);
- The existence of different trends for different ethnic groups also means that monitoring and reporting on the basis of a single aggregated minority ethnic group (such as BAME – Black, Asian and Minority Ethnic) is of diminishing value;
- The stubbornly very low (and only slightly rising) proportion of Black researchers, at just over 1% of UK nationals in the profile and only 2% across all nationalities, stands out – more work is needed to understand and increase the low level of Black participation in STEM doctoral programmes and early research careers to address this;
- The low incidence of reported disability conditions by these early-career researchers needs to be better understood, especially the very low levels of mental health conditions. These stand in stark contrast to the high and increasing levels of mental ill-health reported by undergraduates and postgraduate researchers;
- More consistency in the use of contracts (and transparency in this) and reporting of various types of data about staff would be valuable if we are to develop meaningful analyses in future. Emerging knowledge about variations in the use of different types of employment contract for postdoctoral researchers suggests this is clouding efforts to identify this key population and understand its evolving characteristics.

2. Introduction and project aims

2.1. The diversity and inclusion context

It is increasingly recognised that diversity is a crucial aspect within aspirations for excellence in research, science and technology. There is growing evidence that greater diversity within any workforce and more inclusive working cultures support increased innovation and creativity, and some evidence that they can enhance productivity. Diverse leadership teams can enhance overall performance and more inclusive workforces help foster wellbeing, in turn increasing motivation, performance and staff retention. Diversity is increasingly seen as a competitive benefit, to draw upon a wide diversity of thought in a world where the ability to be innovative is crucial. Others argue it is logical for the diversity of a workforce to reflect that of its customers or environment, so it can interact with and serve them most effectively. These are arguments that are, of course, in addition to the underpinning rationale that there should be fairness of opportunity. Finally, in science fields where there is an insufficient supply of talent, or a risk of that in future, diversity has a role to play in maximising the pool of potential research talent.

The Royal Society (RS), as the UK's premier scientific academy, is strategically committed to increasing diversity in UK science. It aims to do this by embedding diversity and inclusion in all its activities. Enhancing the participation of talented scientists from currently under-represented groups is part of this commitment to diversity.

The RS is a leading supporter of the development of early-career researchers in particular, through several high-profile research fellowship schemes. These support talented postdoctoral researchers in science in the UK who have the potential to become research leaders in their fields. The fellowships aim to help them establish an independent research career, i.e. to become an independent research leader. These schemes include RS University Research Fellowships,[1] Dorothy Hodgkin Fellowships[2] and Sir Henry Dale Fellowships[3] (operated in partnership with Wellcome).

The RS seeks to promote and encourage diversity within these award schemes by accommodating non-linear career paths at the application stage and flexible working arrangements for current award-holders. The fellowships allow for part-time working and periods of sabbatical time or secondment, and there is also provision for maternity, paternity, adoptive or extended sick leave. Consideration is also given to requests for other care-related leave. The Dorothy Hodgkin Fellowship scheme is positioned explicitly to support scientists at in early career who require a flexible working pattern due to personal circumstances.

Another key aspect of the RS diversity and inclusion strategy is commitment to encouraging under-represented groups to apply for its early-career fellowship schemes. To help inform its strategy and approaches, the RS is keen to gain a better understanding of the diversity of awardees, applicants to and those eligible to apply to these schemes, and whether this reflects the diversity of all postdoctoral researchers. By monitoring the diversity profiles of those groups and comparing them it could assess whether award-making is inclusive and enhances the diversity of the scientific research workforce. This project was conceived as an underpinning activity to enable assessment of whether these commitments are bearing fruit. While there is

[1] https://royalsociety.org/grants-schemes-awards/grants/university-research/
[2] https://royalsociety.org/grants-schemes-awards/grants/dorothy-hodgkin-fellowship/
[3] https://royalsociety.org/grants-schemes-awards/grants/henry-dale/

understanding within science that certain groups are under-represented, there is a lack of specific information about levels of representation at key early-career stages (such as post-doctoral staff) in STEM fields.

2.2. Aims, objectives and scope

As part of its attention to diversity and inclusion, the RS records data on a range of characteristics of applicants to its fellowship schemes, during the assessment process and of those who are successful in obtaining a fellowship (awardees). Trends observed in the profile of applicants at the outset and at different assessment stages may give some indication of changes in the diversity of early-career researchers who apply and an indication of whether the assessment process is equitable. Meanwhile, trends in the profile of awardees can reveal to some extent whether the schemes are contributing to efforts for greater diversity within the longer-term scientific workforce (or not).

However, monitoring these types of diversity data and identification of trends in the profile of applicants and awardees are insufficient to understand whether the awarding process is inclusive or has a positive or negative effect on the diversity of those entering the scientific workforce for long-term research careers. What is **crucial in this respect is to establish a baseline profile of those who are eligible to apply, with which to compare the profile of those who do apply and of those who gain awards.** Such monitoring enables assessment to be made of whether the overall award-making process is inclusive, i.e. maintaining or increasing the diversity of those supported as opposed to resulting in a narrower profile of scientists making the transition to research leadership. On the basis of such data, there is the potential to identify whether there is any inherent bias in the award-making process and enable adjustments to be made, and then to assess whether these result in enhancements to the diversity of awardees, who are a key part of the pipeline into research leadership.

The RS seeks to know whether the profile of applicants is representative of the diversity of those who are eligible to apply. If it is shown that the profile of applicants is not representative of the pool of potential applicants, the RS will seek to address such under-representation. The aim of this project is to establish the profile of the applicant pool, i.e. those eligible to apply for these early-career fellowships. CRAC welcomed the opportunity to help the RS in establishing this profile as a key underpinning step to assess the inclusivity of these schemes and potentially in future to address any under-representation that results.

More specific objectives of the project were to:

- Establish a contemporary profile of researchers eligible for each of the three main RS early-career schemes specified above;
- Identify any trends over time in such profiles (for the schemes together, if not possible individually) to assess how the applicant pool may be changing over time;
- Identify any particularly prominent profile differences for key individual subjects;
- Highlight particular intersectionalities between different demographic or other aspects of profile, such as different working patterns for women and men;
- Provide working data files that can be analysed or investigated further by RS staff.

3. Approaches to data analysis

3.1. What is it we want to know?

Table 3.1 summarises the key eligibility criteria for the three RS early-career research fellowship schemes within scope. The aim of the project was to try to establish the profile of the pool of early-career researchers in UK HE institutions eligible for the fellowship schemes, on this basis.

Table 3.1 Eligibility criteria for fellowship schemes

	University Research Fellowship	Dorothy Hodgkin Fellowship	Sir Henry Dale Fellowship
Disciplinary scope	'Royal Society remit'	'Royal Society remit'	Biomedical and related sciences
Postdoctoral experience[4]	3-8 years	Up to 6 years	No limit
Employment contract	Not permanent	Not permanent	Not permanent
Other		Particular attention to need for flexibility (e.g. part-time work)	

Discussion with RS Grants and Diversity staff provided an initial 'wish-list' of the elements of profile sought, including both personal and employment-related issues (Table 3.2). While some other aspects of researchers' experiences or circumstances, such as whether they had taken a career break or parental leave, would be desirable, they were considered too difficult to obtain systematically or absent from the data known to be available.

Table 3.2 Elements of profile data sought about early-career researchers

Personal demographics	Employment profile
Gender (sex)	Research discipline
Ethnicity	Institution type
Disability disclosure	Institution location (UK nation)
Age	Mode of employment (full- or part time)
Nationality	Contract type (permanent or fixed term)
PhD and number of years since PhD	Employment function (i.e. academic)

[4] Excluding time away from research

3.2. Data available, proxies for eligibility and other assumptions

The Higher Education Statistics Agency (HESA) collects data systematically about students and staff in UK HE. Its Staff Record collates information from HE providers about their staff, returned annually, and is by far the most systematic source of data about academic staff in UK universities available, underpinning published descriptions of the workforce such as Advance HE's annual '*Staff Statistical Report*'[5]. For this project and related work, with CRAC's support the RS specified and acquired Staff Record data for the years 2008/09 to 2018/19. These data are the basis for the results and profiles in this report.

Although the HESA data are the most comprehensive available, there are limitations. Coverage for key demographic and most employment characteristics is very good, but not all HE providers complete certain other fields which could shed light on career paths. The data definitions used by HESA for its data fields do not directly identify postdoctoral researchers or map precisely onto the eligibility criteria for the fellowships. This meant that various assumptions had to be made and proxies developed to generate the desired profiles. Appendix 1 records those assumptions and how proxies were selected and used in detail, but the key issues are briefly described here.

3.2.1. Personal demographics

For the key personal characteristics (gender, ethnicity, disability, age and nationality) sought, HESA's data are unequivocal as these are well-established data items in the Staff Record. An individual's highest qualification is recorded, so the data could be filtered to only those holding a doctoral qualification.

3.2.2. Disciplinary scope

The HESA data record primary and subsidiary subject specialisms of staff (called Cost Centres, but in practice based on JACS subject categorisation) at the Principal Subject Area and Principal Subject levels. In consultation with RS staff, we agreed a list of Principal Subjects which approximated to the RS remit subjects (appropriate for the URF and DHF schemes). It was not possible to derive a subsidiary list to match the specific SHDF scheme scope, partly due to difficulty differentiating between biomedical and biological subjects. Many of the results here are therefore for the entire RS remit of subjects. For simplicity, only primary subject specialisms were analysed.

3.2.3. Employment-related eligibility criteria

The RS early-career fellowship schemes target postdoctoral scientists (within the appropriate subject scopes) who do not hold a permanent academic position. As the HESA data only cover staff in UK HE providers, potential international applicants not yet having a position in the UK, or applicants based in industry rather than academia, could not be included in the profile.

HESA does not directly identify postdoctoral research staff within the record, so the profiles we developed were on the basis of whether individuals:

- Were classified as academic staff (not professional services or administrative);

[5] E.g. *Equality+ Higher Education: Staff Statistical Report 2018*, Advance HE, 2019: https://www.advance-he.ac.uk/guidance/equality-diversity-and-inclusion/using-data-and-evidence/statistics-reports

- Had ‘research-only’, ‘teaching-only’ or ‘research and teaching’ contracts (see Appendix 1 for discussion; this strategy departs from some other studies that use research-only contract holders as an approximation for research staff and/or postdoctoral researchers);
- Were at particular job levels (particularly levels K or L, see Appendix 1). Although some staff in Level J will be eligible for RS fellowships, level J includes those already on named postdoctoral fellowship schemes and some who have completed them, including Senior Research Fellows, so Level J staff were not incorporated;
- Those with a fixed-term contract rather than a permanent (open-ended) position.

3.2.4. Postdoctoral experience

Duration of postdoctoral experience – used as an eligibility criterion in two of the schemes (Table 3.1) – cannot be ascertained robustly from the HESA data. The criterion is also intended to exclude time away from research. Age is not a strong indicator because doctoral study can occur at different career stages (and age itself is not an eligibility criterion). In practice, however, staff aged over 50 were filtered out, being highly unlikely to be ‘early-career’ researchers (accepting that some individuals have highly diverse career pathways).

The most relevant HESA data item is duration of employment with current institution, so this was used as a very rough proxy for postdoctoral experience. Only those employed by their institution for up to 8 years were included. With the roughness of this proxy (which ignores any postdoctoral experience at a previous HE provider), there seemed no merit in trying to separate those eligible for different schemes which each have slightly different research experience eligibility criteria, but to consider them together.

3.2.5. Selection and testing of filter combinations

Profiles based on different combinations of these filters and proxies were generated and shared with RS staff to consider their merits, looking at how characteristics differed for each approach and the total size of that population. For example, when a ‘research only’ contract filter was applied at levels K and L for those with a fixed-term contract, the resulting population was much smaller than expected. Investigation revealed significant numbers of early-career STEM staff on teaching contracts, whom we did not want to exclude, so the ‘research-only’ approach was rejected. In practice, many characteristics of the profiles developed were relatively consistent across different strategies, suggesting that the profiles we show here should be valuable in identifying diversity even if the specific population is an imperfect match with that targeted based on the criteria.

Our final, pragmatic selection for the ‘core’ profile was based on academic staff with all of the following characteristics:

- STEM discipline within the overall RS scientific remit;
- A ‘research only’, ‘teaching only’ or ‘research and teaching’ contract;
- Employment at level K or L;
- Employment on a fixed-term contract;[6]

[6] Data for staff from University College London were treated in a bespoke fashion in certain analyses, as highlighted in the relevant chapter

- Up to 8 years employment duration with current institution;
- Age under 50 years.

The combination of these filters resulted in a population of just over 13,400 staff within the overall RS scientific remit in the 2018/19 data. This is smaller than the population we were expecting (based on estimates in other studies[7]), probably due to exclusion of Level J staff. Ideally, we would include some of the Level J staff but not all (for reasons stated above) but that was not possible using these data. Given the limitations in relation to postdoctoral experience and disciplinary scopes, it was agreed not to attempt to produce different profiles for the URF and SHDF schemes but instead to use some broad disciplinary groupings.

3.3. Presentation of profile data

Results in this report are based on data for 2018/19 (the most recent currently available), with comparative profiles for 2017/18, 2015/16, 2013/14 and 2008/09, which are respectively 1, 3, 5 and 10 years prior).

As required in publication of results derived from HESA data, the size of any sub-group was rounded to the nearest 5 prior to presentation (even if reported as a percentage). As a result, some results appear as zero (e.g. 0%) even if there are 1-2 individuals within that group; this could apply, for example, to the instance of Black researchers within certain groups as their numbers tend to be particularly small. This also means that sizes of some sub-groups, after rounding, may not sum exactly to the expected total.

The data were obtained from HESA on a full-time equivalent basis, and all data here are presented unweighted.

[7] For example, a total of c.50,000 research-only contract staff according to HESA, 2018/19, of which c.70% are thought to be in STEM, i.e. c.35,000

4. Profile of those eligible for RS early-career fellowships

4.1. Overall profiles

Table 4.1 summarises the characteristics of individuals in 2018/19 we considered eligible for RS fellowships, derived using the filters and proxies outlined. The requirement to round data to the nearest five means that sub-totals for a characteristic may not sum exactly to its total.

Table 4.1 Derived profile of eligible researchers within RS remit subjects, for 2018/19

	N	%			N	%
Gender				**Employment mode**		
Female	5640	42.1%		Full time	11620	86.7%
Male	7760	57.9%		Part time	1785	13.3%
Other	5	0.0%				
Age				**Mission Group**		
< 35	8660	64.6%		Russell Group	9700	72.4%
35-49	4750	35.4%		Other	3705	27.6%
Nationality				**Location of HEI**		
UK	5070	37.8%		England	11480	85.6%
Other EU	3900	29.1%		Scotland	1045	7.8%
Rest of World (RoW)	4275	31.9%		Wales	520	3.9%
Unknown	160	1.2%		NI	365	2.7%
Ethnicity of UK nationals						
White	4135	81.6%				
Minority ethnic groups	620	12.2%				
Asian	*380*	*7.5%*				
Black	*65*	*1.3%*				
Mixed	*135*	*2.7%*				
Other	*40*	*0.7%*				
Unknown	315	6.2%				
Ethnicity of UK nationals as % of known ethnicity						
White	4135	87.0%				
Minority ethnic groups	620	13.0%				
Asian	*380*	*8.0%*				
Black	*65*	*1.4%*				
Mixed	*135*	*2.8%*				
Other	*40*	*0.8%*				
Disability						
No known disability	13000	96.9%				
Known disability	410	3.1%				
Cognitive/learning	*125*	*0.9%*				
Mental health	*70*	*0.5%*				
Sensory/Medical/Physical	*135*	*1.0%*				
Other/multiple	*80*	*0.6%*				
Total population	***13405***					

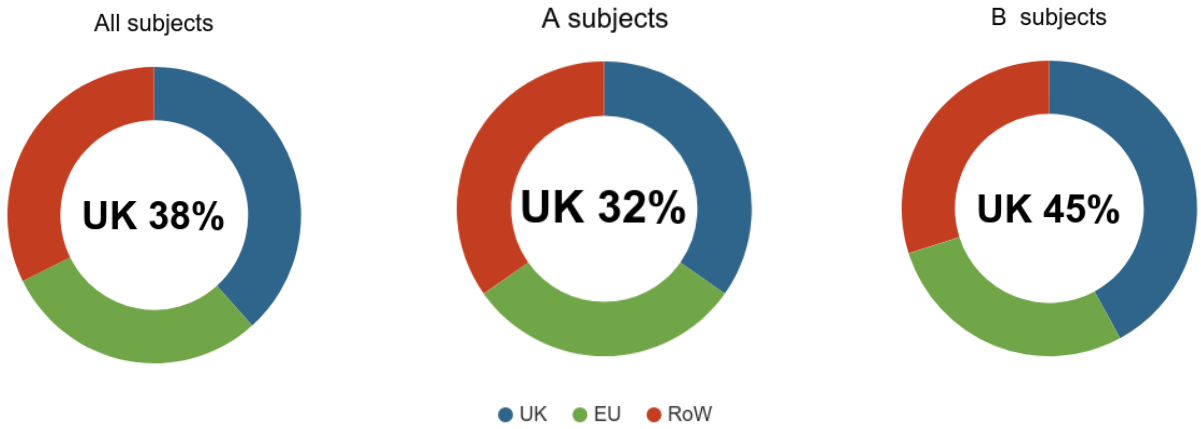
Similar profiles were developed using data for 2017/18, 2015/16 and 2013/14, tabulated in Appendix 2. We assumed that eligibility criteria did not change during this time, so maintained the filters used. Unfortunately results prior to 2013/14 were not directly comparable as the staff level classification had not been used and older profiles could not use that filter. A 2008/09 profile is included in Appendix 2 as an indicative profile 10 years prior to the core profile but had to be defined in a different way and the population is noticeably smaller.

The key characteristics of the profiles and how they have changed over this five-year period, for which the profiles are fully comparable, are described in the next section. What is also immediately noticeable is that the size of the population in these profiles increased by over 1000 individuals (i.e. over 8%), between 2013/14 and 2018/19. Values for *N* for all charts and their respective segments can be found in the tabulated profiles in Appendix 2.

4.2. Trends in key characteristics

4.2.1. Nationality

UK nationals are the largest group within the overall profiles, comprising just under 38% in 2018/19. Those of other EU nationalities (29%) were slightly outnumbered by staff of a nationality in the rest of the world (RoW, 32%).



Analysis showed that this aspect of profile differed quite strongly with subject, with fewer UK nationals (32%) in A-side subjects and more non-EU nationals (the largest group at 39%). By contrast, in the B-side subjects, UK nationals were more populous at 45% and non-EU nationals fewer at only 23%. The proportion of EU nationals was quite similar in both groups.

Nationality is one aspect of the profile that has been changing significantly over time, with the proportion of UK nationality falling relatively consistently from over 46% in 2013/14 to under 38% in 2018/19. Perhaps surprisingly, the proportion of other EU nationalities has not changed greatly (remaining in the range 28% to 31% throughout) and it is the rise in other nationalities that has driven the change in profile, rising from under a quarter in 2013/14 to almost one third in 2018/19. Figure 4.1 illustrates this changing profile. How it has been changing in different subject areas is shown in the next chapter.

Nationality is an aspect of profile that intersects strongly with several others, as highlighted in chapter 6, including gender and disability. Its relationship to ethnicity is also highlighted later in this report.

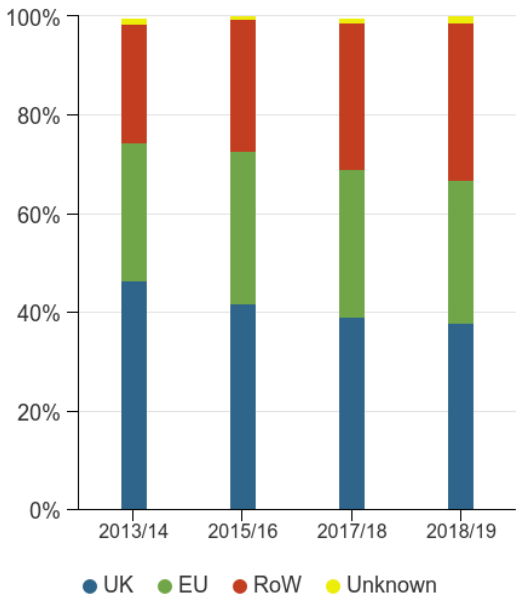
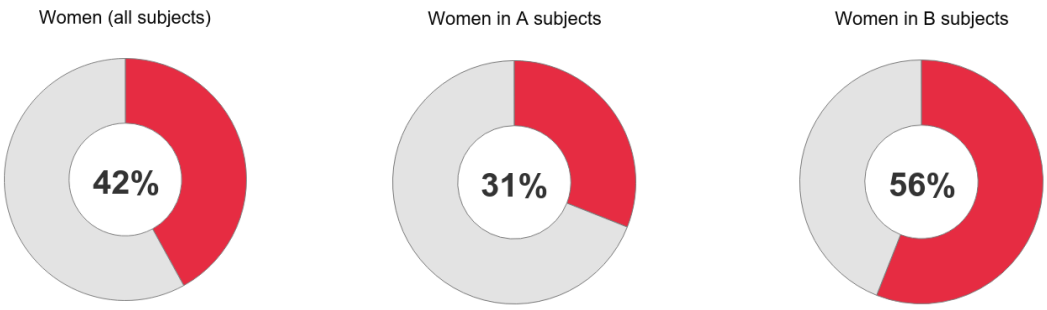


Figure 4.1 Nationality of eligible researchers within RS remit subjects, with time

4.2.2. Gender (sex)

In 2018/19, 42% of eligible academic staff within the overall RS remit subjects were female. This proportion has remained very consistent overall across the period studied. For comparison, women made up just under 47% of all academic staff in UK HE in 2018/19 (i.e. at all grades and in all types of academic role). Interestingly, that total proportion has also not shifted much at all over the past 10 years, although the total size of the academic workforce has increased considerably.



When the profile is analysed by nationality and/or by subject, differences and more complex patterns emerge which are masked by the consistent 42% proportion overall. As expected, there are fewer women in the physical sciences and engineering/technology (the RS 'A-side' subjects, 31% in 2018/19) and more in the biological/biomedical sciences ('B-side' subjects, 56% in 2018/19).

Figure 4.2 shows that, overall, the proportion of women amongst EU nationality researchers has been rising, offsetting a slightly falling proportion amongst UK-domiciled researchers. The proportion of those from outside the EU that are women is much lower at only around 34%. More detail about these trends is given in the next chapter.

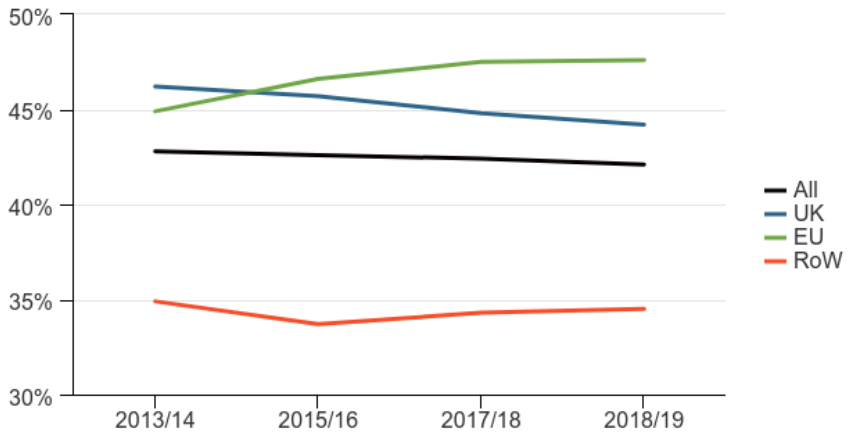


Figure 4.2 Gender profile of eligible researchers with time, by nationality

4.2.3. Age

Given that an age filter was applied in order to establish the profiles, there is limited value in analysing eligible researchers' ages in detail. Just under two thirds of those in the profile were aged under 35 and this proportion appeared to remain fairly constant across the period studied (although was slightly lower amongst women than men).

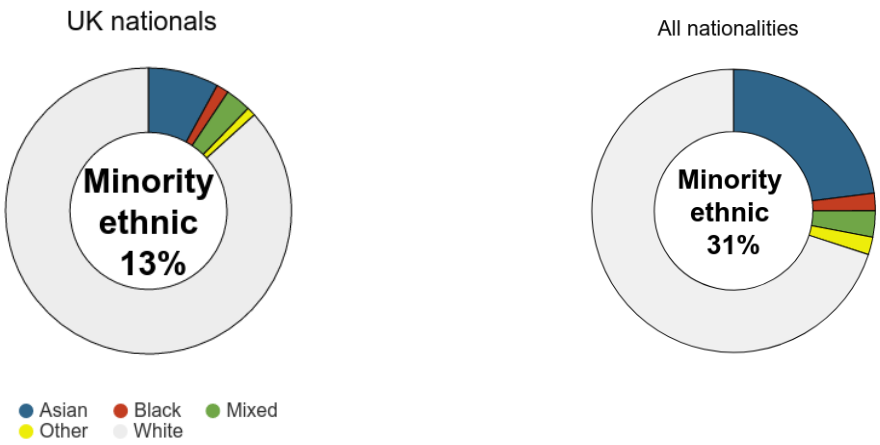
4.2.4. Ethnicity

The ethnic background of staff is most robustly considered for those of UK nationality, for whom the current categorisation used by HESA was designed. In 2018/19, just over 12% of the staff in the profile were of Black, Asian or other minority ethnic backgrounds (referred to in this report collectively as 'minority ethnic groups'), while nearly were 82% were white and 6% of unknown ethnicity. As a proportion of those of known ethnicity, this translates to 87% white and 13% minority ethnic background. The latter comprised mostly those of Asian background (8%) and only just over 1% Black. This last proportion constituted only 65 individuals, amongst the 4750 UK-domiciled staff of known ethnic background. This strong under-representation at postdoctoral research level is more acute than amongst doctoral students (where there is still strong under-representation at 4%) or amongst first degree students (8%).[8]

In this report, we also report the ethnicity for all nationalities together (based on the same categorisation, which admittedly works less well outside the UK). Stated as proportions of those of known ethnicity, the proportion of all nationalities of minority ethnic background is 31% while 69% are white. Although at first glance this is a much more diverse canvas ethnically than amongst only the UK nationals, analysis shows that those of minority ethnic background are dominantly of Asian heritage (23%) and still only 2% are Black. This strong imbalance

[8] These proportions from HESA data are for all subjects combined in 2018/19.

reflects the large number of Asian researchers of non-UK nationality, including researchers who have undertaken mobility to the UK from countries in Asia.



Viewed over time, there has been slight diversification ethnically amongst UK nationals, as the proportion with a minority ethnic background (amongst those of known ethnicity) has risen from 12% to 13% over the five years studied (Figure 4.3). However, examination of the numbers of individuals shows that numerically the size of the minority ethnic population within the profiles has essentially remained static: there are 625 UK-domiciled minority ethnic staff in the 2013/14 profile and 620 in 2018/19. This is because of the decreasing proportion over time of the overall profile that is of UK nationality.

The chart also includes the results for all nationalities together. This illustrates that while the proportion of UK researchers of minority ethnic backgrounds has risen very slightly, there has been a faster rise in the proportion of minority ethnic staff overall, and in those of Asian origin in particular (from 17% to 23% of known ethnicity) when all nationalities are aggregated. Note also that these proportions are of an increasing population over time (from 1945 to 2875 minority ethic researchers over the period) as the total non-UK profile segment grows, including many inwardly mobile researchers from Asian countries. On the other hand, the proportion of Black researchers has risen much more modestly, from 1.6% to 2.1% over the same period (although this was growth from 180 to 260 individuals). Black researchers remain strongly under-represented, whether UK nationals or all nationalities are considered. With so few role models available, this could deter young Black science students from pursuing a research career.

It is possible that the large and increasing proportion of non-UK Asian staff deflects some attention from a focus on the extent to which there is minority ethnic group under-representation specifically within those of UK nationality. For context, the 13% of UK nationals of minority ethnic origin within the 2018/19 profile is somewhat higher than for all academic staff across all subjects (which is nearer to 10%), but lower than amongst doctoral students (20%) or first degree students (26%) in that year. Those with a minority ethnic background comprised about 13% of the total UK labour force in 2018[9] and 13% of the entire UK population in the 2011 Census.

[9] Based on the Annual Population Survey

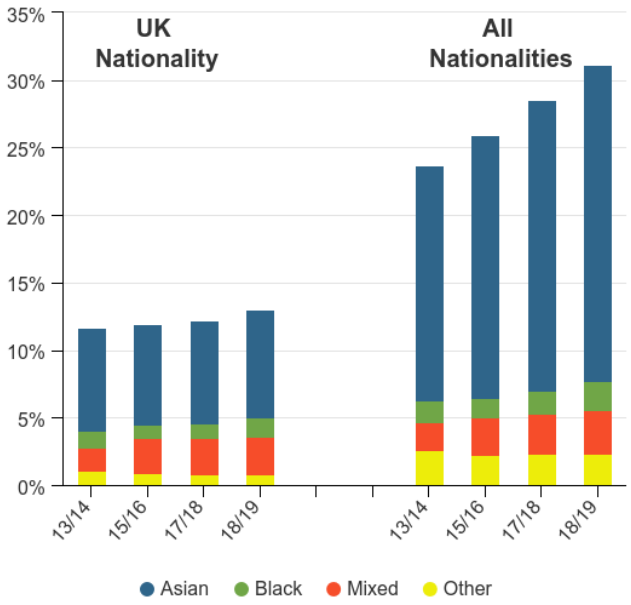


Figure 4.3 Proportion of eligible researchers of ethnic minority origin, with time. Proportions are expressed as percentages of those of known ethnicity. Note that *N*s for UK nationals are roughly constant over time: 2013/14: 625; 2015/16: 600; 2017/18: 595; 2018/19: 620, while those for all nationalities rise from 1945 to 2875 over the same period.

4.2.5. Disability

In the 2018/19 profile, just 3.1% had disclosed a disability (i.e. 410 individuals, out of 13405). However, even this low level represents an increase across the five years studied, as the total has risen from 2.6% in 2013/14 (representing 325 individuals). These is a lower level than reported for the entire academic staff population who have declared a disability (just under 5% in 2018/19), and much lower than the proportions within the undergraduate population (15%) or those undertaking doctoral study (10%) in that same year.[10] The greatest differences between these results and those for students are in relation to mental health and cognitive/learning differences, which are much higher amongst students.

Figure 4.4 shows the overall increase with time in the reporting of disability in the profiles and that the increase is being driven by higher proportions disclosing either a mental health condition or a cognitive or learning difference, while the proportions declaring a long-term medical condition or 'physical' disability (including blindness or deafness) are remaining roughly constant. It is interesting that the declared incidences of mental health conditions in these profiles are very low, at only half of one per cent, yet this is the category which is highest in the student population. The number of individuals declaring such conditions were very small, increasing from just 30 in 2013/14 to 70 in 2018/19. It seems highly likely that the number and proportion of postdoctoral researchers disclosing mental health issues, in particular, will rise in future, as more young researchers with a higher propensity to declare such conditions enter the workforce.

[10] HESA student record data 2018/19: https://www.hesa.ac.uk/data-and-analysis/students/whos-in-he

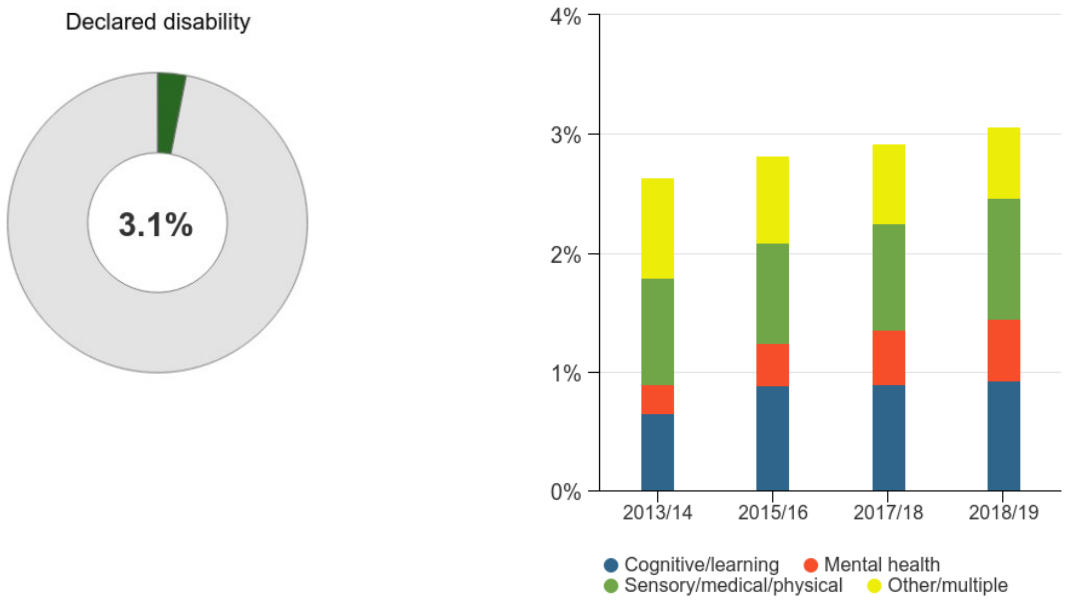


Figure 4.4 Proportion of eligible researchers who have disclosed a disability, with time. Note that the *N* values are small: 2013/14: 325; 2015/16: 365; 2017/18: 390; 2018/19: 410.

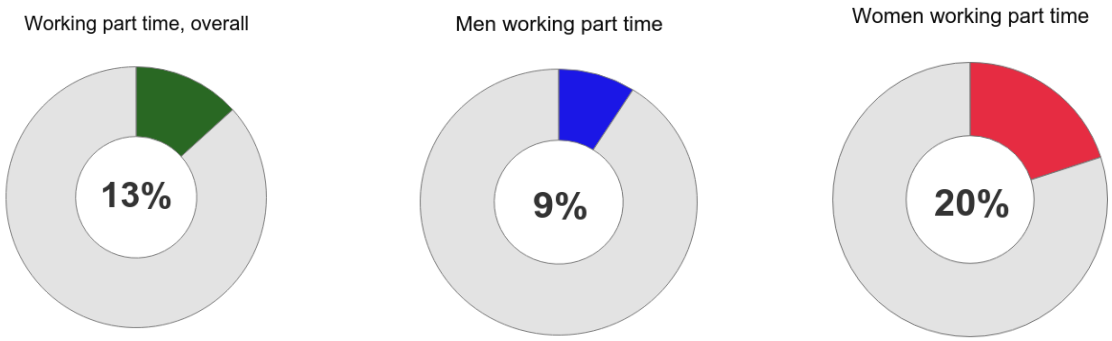
These trends reflect findings within recent detailed work on disability for the RS.[11] In that report, we drew attention to these low levels of disclosure amongst early-career researchers in STEM subjects, which appear to be particularly low for those on research-only contracts (compared with teaching contracts). It also highlighted the very low rates of declaration amongst senior STEM academics (especially of mental health conditions) who are potentially the role models for aspiring researchers, which may not encourage disclosure of conditions in early career.

4.3. How and where they work

4.3.1. Mode of employment

13% of researchers in the 2018/19 work part-time, which is well below the percentage in the entire academic workforce (which is around one third) or the UK workforce as a whole (26%)[12]. This aspect of employment intersects strongly with several other characteristics, including gender, disability and nationality, as shown in Chapter 6. The proportion of women in the 2018/19 profile working part time at 20% is more than twice that for men (9%). Overall, however, the proportion has not changed substantially during the period studied, other than being somewhat higher specifically in 2013/14 (which is unexplained).

[11] *Qualitative research on barriers to progression of disabled scientists*, report by CRAC for Royal Society, 2020
[12] Labour Force Survey, November 2018



The low incidence of part-time work amongst this population may reflect cultural assumptions that full-time work is the 'norm' in postdoctoral research whereas more teaching posts, in other subjects in particular, appear to be available part-time. The 13% proportion here, overall, aligns well with what is reported for research staff in the CROS survey (e.g. 14% in 2017).[13]

4.3.2. Institution type and location

The researchers in the profile are highly concentrated in research-intensive universities, such as the member institutions of the Russell Group (72%). This concentration has very slightly increased with time, from 70% in 2013/14. This presumably goes some way to explaining why high proportions of early-career fellowship applications awards are made from researchers at a limited number of institutions, typically large Russell Group member universities, several of which are located within the so-called Golden Triangle in SE England.

There is a strong geographical concentration of this group of researchers in universities in England (over 85%), with around 8% in Scotland, 4% in Wales and 2% in Northern Ireland. This directly reflects that 20 of the 24 members of the Russell Group are in England (which itself is 83%), and the largest of these institutions in terms of researcher numbers are also in England. This geographical distribution has not shifted significantly in the period studied.

[13] Careers in Research Online Survey: results published in *Five Steps Forward*, Vitae, 2017 https://www.vitae.ac.uk/vitae-publications/reports/vitae-5-steps-forward-web.pdf

5. Subject-based and other selected profiles

In the knowledge that some aspects of the diversity profile vary with subject, a range of additional profiles were developed. In this chapter, the key characteristics of profiles for the RS A-side (broadly, physical sciences) and B-side subjects (broadly, biological sciences), respectively, are highlighted, with some insight as to how they are changing with time. In addition, a number of more specific profiles were developed for the 2018/19 year, for comparative purposes. These include an 'all STEM' profile for the full range of STEM subjects and some more subject-specific profiles, including for physics, chemistry, engineering disciplines, and mathematics and computing. As before, *N* values can be found in the tables in Appendix 3 or 4 respectively, but they are highlighted where they may be particularly small.

5.1. Very broad subject-based profiles and trends

Appendix 3 contains tabulated profiles across the period studied for the RS A-side subjects together (physical sciences, mathematics, engineering, computer sciences and technology) and B-side subjects (broadly, the biological and biomedical sciences). The key differences in profile between these two groupings are highlighted here.

5.1.1. Nationality

There are significant variations in the nationality profile of researchers for the two broad subject groupings. The proportion of UK nationals in 2018/19 in B-side subjects (45%) is higher than for A-side (32%), while non-EU nationals are the largest group within the A-side subjects (39%) but far fewer in the B-side subjects (23%). EU nationals form quite similar proportions in both groups. Figure 5.1 shows how the proportion of non-EU nationals in the A-side subjects has risen steadily over time and risen more gently in B-side subjects. In contrast, the proportions of both A-side and B-side researchers of UK nationality have decreased steadily. The proportion of EU nationalities has remained in the range 28% to 31% throughout. It is the rise in non-EU nationalities that has driven the changing profile.

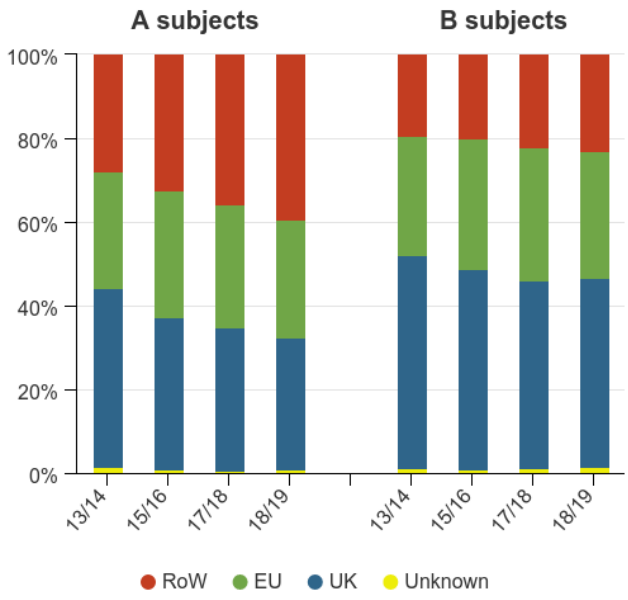


Figure 5.1 Nationality of eligible researchers with time, by broad subject grouping

5.1.2. *Gender*

The clear difference in gender profile for A- and B-side subjects was shown in chapter 4, with nearly the proportion of women nearly twice as high on the B-side (56%) as A-side (30%) in 2018/19. While the proportion overall (42%) has been roughly unchanged with time, that overall consistency masks changes within the subject areas with nationality. When analysed within the two broad subject areas and also with nationality, there has been a rise in the proportion of women amongst EU nationals in the B-side subjects but not amongst UK nationals (Figure 5.2). For the A-side subjects, there is a fall with time in the proportion of UK researchers who are women, nor any rise amongst those from outside the UK. The impact of the rising proportion of researchers from outside the UK, especially in A-side subjects, is highlighted throughout this report.

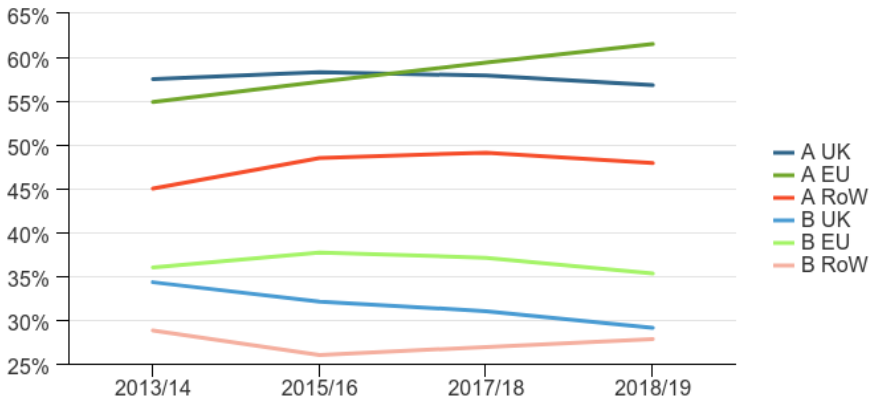


Figure 5.2 Gender profile of eligible researchers with time, by subject and nationality[14]

5.1.3. *Ethnicity*

Amongst UK nationals, the proportion of researchers of minority ethnic background in A-side subjects in any year studied is higher than amongst those in B-side subjects; for 2018/19, these proportions were 15% and 11% respectively (of those of known ethnicity). Figure 5.3 shows these proportions and how they have changed with time, demonstrating that there has been a slight rise on the A-side for UK nationals (proportionally) but little change within the B-side subjects. As noted previously, caution needs to be applied to these trends because numerically these are not necessarily increases; the number of UK-nationality minority ethnic researchers on the B-side was relatively consistent (285 in 2013/14; 295 in 2018/19) while on the A-side there was a slight fall from 340 to 325 individuals. These apparently counter-intuitive trends are because of the falling proportion of UK nationals in the profile population, which has been especially marked for the A subjects.

When ethnicity is considered across all nationalities together, similar trends emerge in terms of proportions. Figure 5.3 shows a much stronger increase with time is for the A subjects than the B-side. It also shows the predominance of those of Asian background amongst minority ethnic researchers and that it is growth in this group that is driving the changes. In this case, because the non-UK population is rising within the profiles, this means that numerically those

[14] Data from years prior to 2013/14 not comparable

of minority ethnic background are rising substantially, unlike the situation for UK nationals alone.

The proportion of Black researchers is much lower than for those of Asian background but increasing slightly, reaching 1.5% of UK nationals on the A-side by 2018/19 (in practice, still only 35 people) but only around 1% for B-side subjects (30 people). Across all nationalities combined, these proportions are slightly higher: 2.1% (150 people) for A-side and 1.8% (110 people) for B-side subjects.

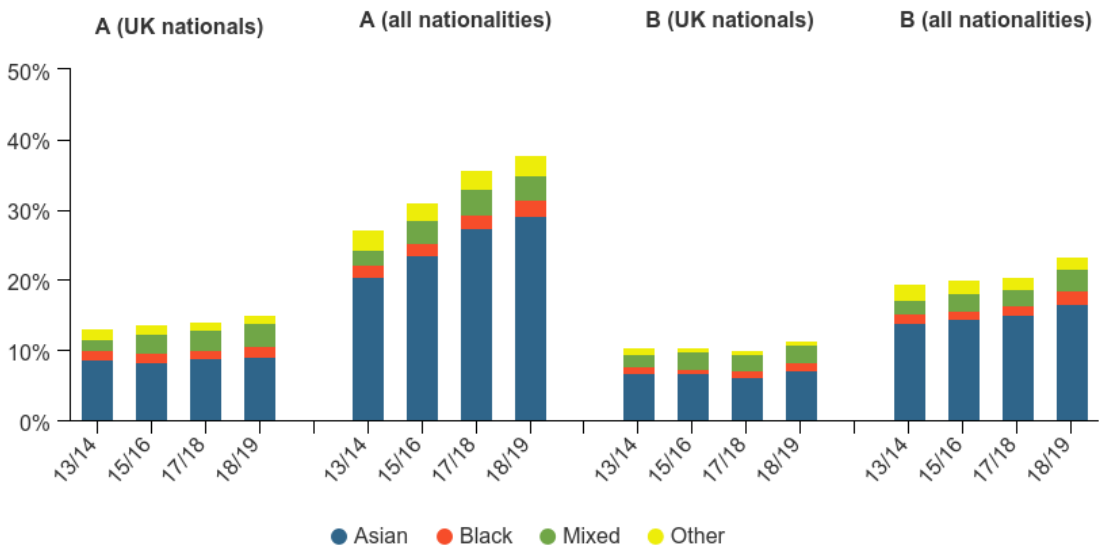


Figure 5.3 Ethnicity of eligible researchers, with time, by broad subject group and nationality. Note that *N* values for UK nationals are small: e.g. 2013/14: A – 340, B – 285.

5.1.4. Disability

In 2018/19 a higher proportion of B-side researchers in the profile reported a disability (3.3%, which is 205 individuals) than of A-side researchers (2.8%, but also by coincidence 205 individuals), and a similar difference was also seen in 2017/18. However, in previous years analysed there did not appear to be consistent differences. The data seem to indicate greater recent growth in disclosure of disability by researchers in the biological and biomedical sciences (in which category, presumably, those studying disability itself would also be located) than in the physical sciences, engineering and technology subjects. This difference was seen in our recent report on disability for the RS, which covered a wider range of career stages.

Analysis of the disability categories within these data suggest somewhat higher levels of physical and long-term health (medical) conditions amongst those working in B-side subjects than A-side, across all years studied, although the actual numbers of individuals are very modest. There is also some evidence that cognitive and learning differences are somewhat more commonly reported by those in the A-side subjects, but only in the two most recent years. In the next section some clear differences are reported between different individual subjects, so analysis may be more fruitful at that level.

5.1.5. Employment characteristics

The proportion of B-side researchers working in Russell Group institutions has remained relatively consistent over the years studied, at around two thirds. On the other hand, the concentration of A-side researchers in those universities is not only higher but appears to be rising, at just over three quarters since 2017/18 (Figure 5.4). This difference did not, however, translate to any difference in the proportions of researchers working in institutions in different UK nations, either with time or broad subject grouping.

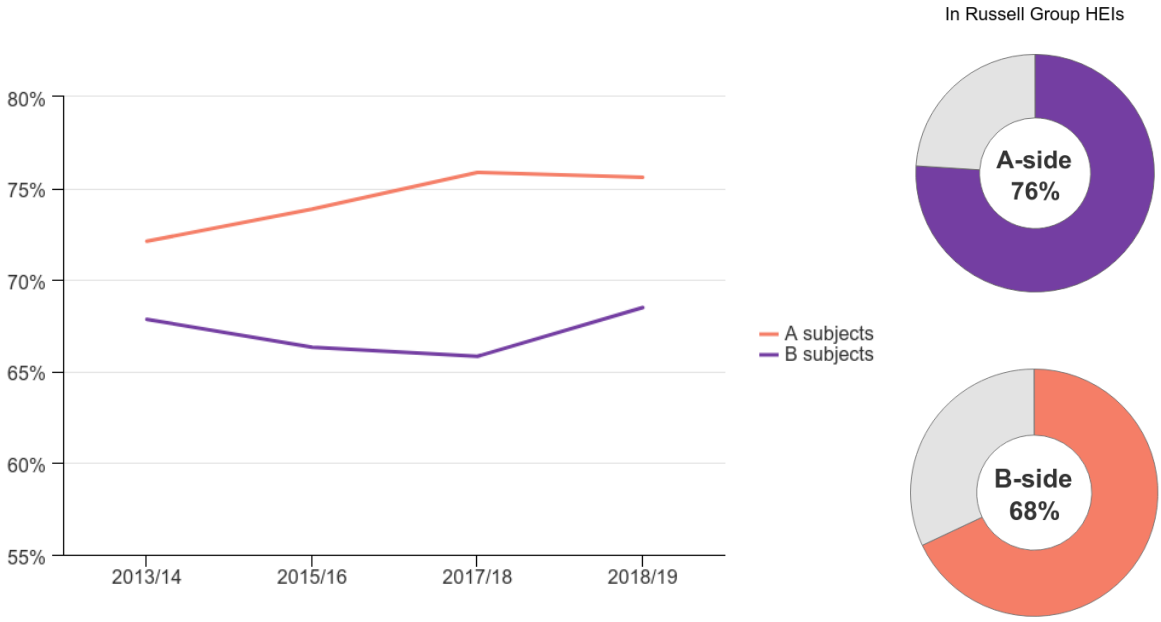


Figure 5.4 Proportion of eligible researchers working in Russell Group institutions, with time and broad subject area

There was some difference, however, in relation to their mode of employment. In 2018/19. only around 10% of A-side researchers worked part-time, whereas this was 18% of those in B-side subjects (potentially reflecting the gender difference, as this is an aspect of profile where there is a strong intersection). While the proportion working part-time seems to fluctuate somewhat year by year, the difference by subject area broadly remains.

5.2. Subject-specific profiles for 2018/19

A range of profiles was developed for the 2018/19 year in order to investigate any differences in diversity for specific subjects or groups of subjects: physics and chemistry individually, the engineering disciplines as a group, and finally mathematics and computing together (because either of these is rather small on its own). These are tabulated in Appendix 4. As before, please refer to the tables in Appendix 4 to ascertain values of *N* for items in the charts presented.

The key differences and characteristics of these profiles are described in this section, again set out by theme, including some comparisons with the overall RS remit subjects profile and that for the B-subjects (biological and biomedical sciences). Results for the A-side subjects as a group are not shown here because these specific subjects comprise much of this group.

5.2.1. Nationality

As intimated in section 5.1, there is some variance in the nationality profile of researchers by subject. Figure 5.5 summarises this aspect of the 2018/19 profiles, showing that there is quite substantial variation in some subjects. For example, 45% of researchers in the B-side subjects are of UK nationality, whereas this is markedly lower in physics (33%), computing/maths (31%) and lowest in engineering at 24%. The proportion from other EU nations is relatively consistent across all subjects at 28-32% except for engineering where it is lower at 22%. In contrast, over half of the engineering researchers are of non-EU nationalities (53%) and in computing/maths this is over 40%, whereas for the B-side subjects it only 23%.

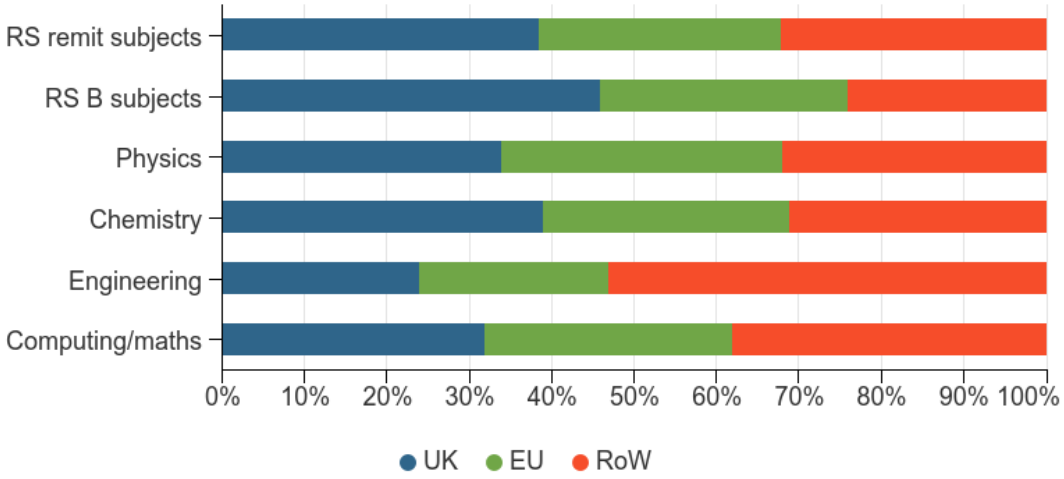


Figure 5.5 Proportion of eligible researchers by nationality, with subject, for 2018/19

It is useful context to note that in all of these subjects, these researchers are more diverse in terms of nationality than the total workforce, presumably due to high mobility at early career stages. This reflects the attractiveness of the UK as a destination for early-career researchers, at least in recent years. It also begs the question of whether many of these mobile researchers of non-UK nationality will remain in the UK in the long term and/or how the nationality profile of the senior academic workforce may change in future.

5.2.2. Gender

The lack of gender parity in science is probably the most widely known aspect of its diversity, but analysis of the profiles for individual subjects brings home how this varies by subject (Figure 5.6). This reminds us that women are in the majority at this career stage only in the biological and biomedical sciences, and a distinct minority group in subjects including engineering, physics, and computing and maths.

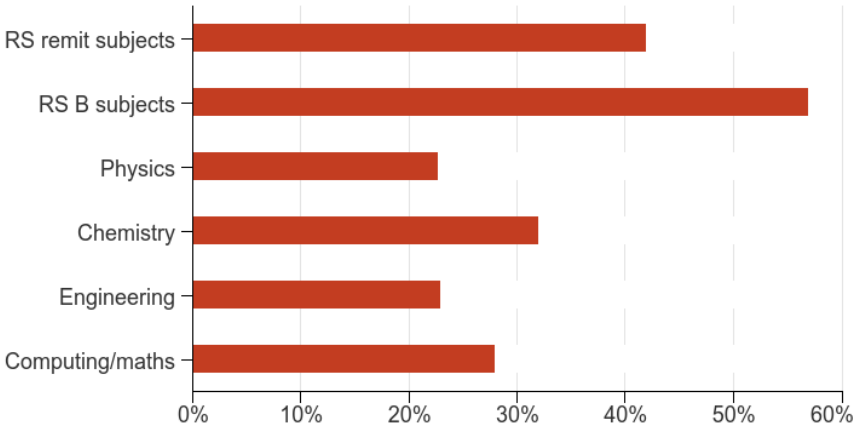


Figure 5.6 Proportion of women amongst researchers in selected subjects, 2018/19

However, in parallel with the position for international diversity, the proportion of women in each of these profiles is higher than their proportion in the academic workforce at a more senior level in the respective subject/group. Across the full RS remit, 42% of the eligible profile are women, but they make up only 31% of more senior staff. As another example, in physics, where the proportion in the profile is almost 23%, although this is low it is higher than the 16% of more senior staff who are female. Therefore, if RS early-career award-making matched the gender diversity in the eligible researcher pool, or was greater, this could potentially improve the gender diversity of the academic workforce over time. This applies for the whole RS remit and for each subject separately analysed here.

5.2.3. Ethnicity

We noted earlier in this report that 13% of UK nationals of known ethnicity in the main profile for RS remit subjects (in 2018/19) are of a minority ethnic background, and 87% white. By subject, this varies from 20% minority ethnic groups within engineering subjects down to just over 7% in physics. Figure 5.7 shows these variances and that the differences by subject are mostly due to differences in the proportions of Asian background, while the smaller proportions of mixed race or other backgrounds vary less. The proportion of Black researchers in the profile is 2% or lower in all cases and is zero for chemistry or physics (where there are so few researchers that their number is rounded down to zero). The *N* values for the individual subjects are very small, ranging from 90 individuals of minority ethnic background in engineering down to 40 in chemistry and 30 in physics.

In comparison, the ethnicity profiles for all nationalities combined are more diverse, with considerably higher proportions of minority ethnic researchers in every subject than amongst UK nationals. They also vary more strongly by subject. For engineering, minority ethnic researchers together comprise a greater proportion than white researchers (when all nationalities are included).

For all of these subjects, the higher overall minority ethnic proportion (i.e. of all nationalities, compared with UK nationals) is dominantly driven by a much higher proportion of researchers of Asian origin. The proportions of other backgrounds including Black origin are not markedly higher than for UK nationals, other than in engineering where the proportion of Black

researchers is just over 3% (65 individuals, compared with 2% of UK nationals which is just 10 individuals). With the overall growth in proportion of non-UK nationals, it is likely that in engineering researchers with an Asian background will become the largest ethnic group (at this level of categorisation), i.e. larger than those of white background.

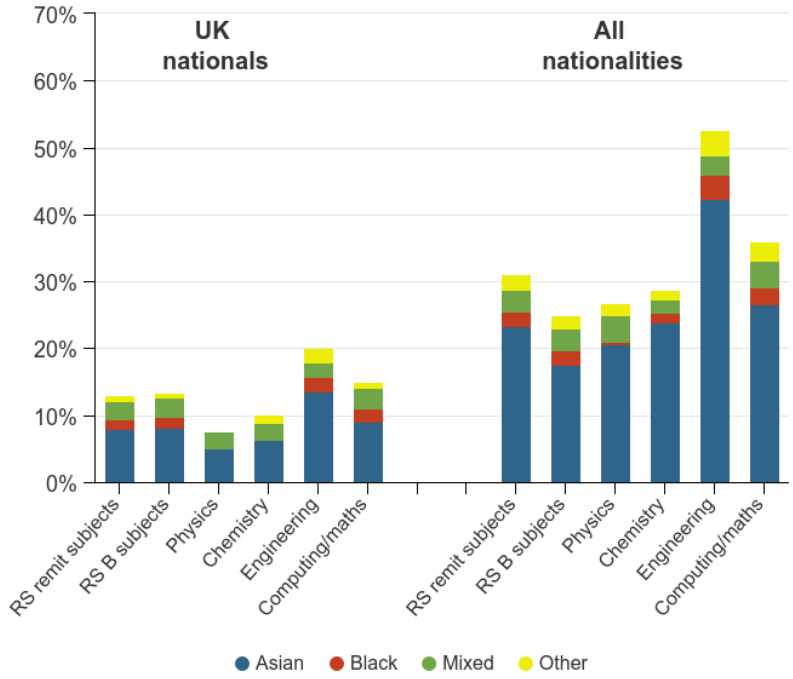


Figure 5.7 Proportion of eligible researchers of ethnic minority background, expressed as percentage of those of known ethnicity, with subject, 2018/19. Some *N* values are very small (e.g. Physics, UK nationals: 30 minority ethnic individuals); all *N*s can be found in Appendix 4

In many UK contexts, policymakers are rightly concerned with under-representation of ethnic minorities and this is an issue for the science workforce. However, given its highly international composition, especially in certain subjects like engineering and at certain career stages, effort may be needed to identify and remember that there is under-representation amongst those of UK nationality. This issue arose in a recent study of graduates entering the engineering workforce, where several international employers did not consider under-representation of minority ethnic engineers of their UK workforce to be an issue, as they could demonstrate racial diversity across their entire global workforce.

5.2.4. Disability

In contrast to the relatively prominent variances by subject in gender and nationality, diversity at first glance looks quite consistent, with 96-98% of researchers in the profiles not disclosing a disability. However, there is variation within the small proportions who do disclose a disability by subject, ranging from 2.0% to 3.8% for the subjects analysed. Disability is highest in computing and maths (3.8%) and lowest in engineering subjects (2.0%), and the latter contributes strongly to the low rate of disability seen for A-side subjects in the previous section. In some cases these proportions represent very small numbers of individual researchers, especially in chemistry (30 individuals), physics (40) and engineering (40).

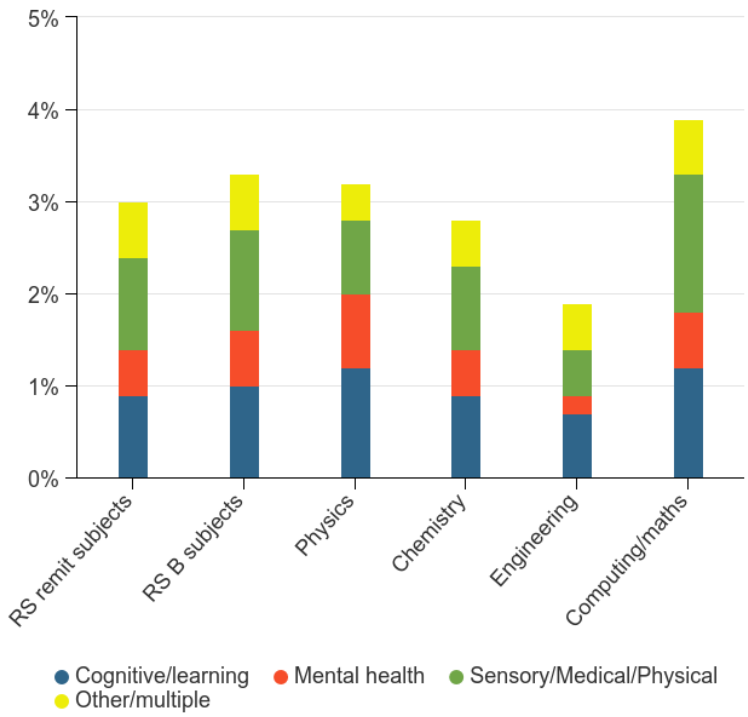


Figure 5.8 Proportion of eligible researchers declaring disability of varying types, by subject area, for 2018/19 year. *N* values can be very small: chemistry (30), physics (40), engineering (40), computing/maths (65)

Figure 5.8 illustrates both the differences in all types of disability combined by subject and also the proportions declaring different types of disability or condition. Caution is needed as can be proportions of only a few tens of researchers. However, with that caveat, in engineering the reported proportions of all three main groups of disability are lower than for other subjects, and the proportion with a sensory/physical/medical disability or condition appears particularly low. In contrast, computing and maths as a group has much the highest rate of this group of conditions, amongst these subjects.

There are intersections with both nationality and gender impacting on these trends, as overall somewhat higher proportions of female researchers tend to declare disability than male, and lower proportions of non-UK researchers than of UK nationality. There is more discussion on these intersections and, for example, in relation to part-time employment, in Chapter 6.

5.2.5. Age

Full analysis of the age of researchers was not undertaken, given the use of age as a filter in the development of profiles. Using very broad age bands, there was some variation in the ages of researchers in profiles for different subjects. Those in the B-side subjects were on average somewhat older (with 40% aged 35 or over) whereas those in physics and chemistry were the youngest (with 26% in this age group, i.e. almost three quarters under 35 years). More sophisticated analysis would be required to assess whether such a difference is due to, for example, doctoral study taking place earlier by most of those in physics and chemistry than other subjects, or whether other factors are key. As the age bands were very broad, it is also possible that these apparent variations might not be replicated using different age groupings.

5.2.6. Employment mode

Mode of employment intersects strongly with gender, so some of the strong variation in the proportions that work part-time in different subjects are likely to result from different gender profiles of the subjects. In the B-side subjects, 17% of researchers worked part-time in 2018/19, whereas the proportions are much lower in physics (under 6%), chemistry (7%) and engineering (8%). Nationality is also relevant, as fewer non-UK researchers work part time, overall. Figure 5.9 summarises these data by subject.

However, while computing and maths subjects have a male majority (72%), the proportion of researchers working part-time in these subjects is relatively high at 16%. This is presumably not driven by the gender composition but may result from environmental reasons, such as different working patterns and/or collaborative posts with the computing industry, for example.

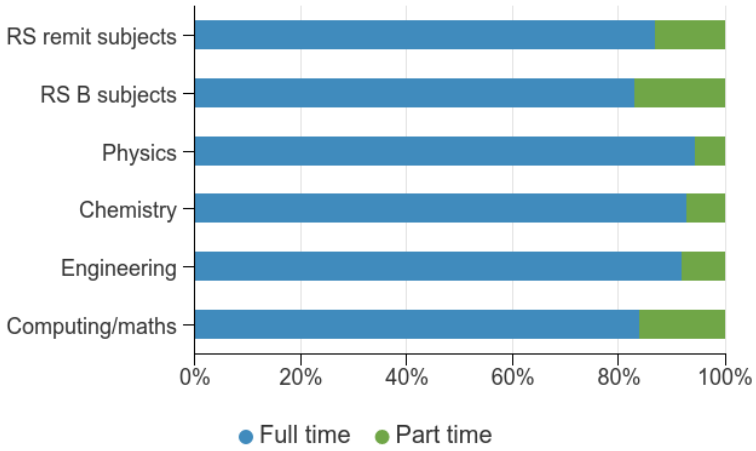


Figure 5.9 Mode of work of eligible researchers, by subject (2018/19)

5.3. ‘Top 10’ institutional profile

A profile was also developed for eligible researchers solely at the 10 institutions from which most applications for the RS early-career schemes have been made in recent years, to see if concentration of award-making at these institutions impacts on the diversity of the total population of researchers being funded.

Table 5.1 shows that the profile of eligible researchers in the Top 10 institutions is in most respects less diverse than the overall pool. It features lower proportions of researchers who are female and/or disabled and who were working part-time in 2018/19. On the other hand, there is a higher proportion of researchers of non-UK nationalities, especially non-EU. Interestingly, amongst UK nationals (which is admittedly a smaller proportion than in the overall RS profile), the proportion of researchers of minority ethnic origin is actually slightly higher.

It could be argued, on this basis, that with a relatively high proportion of awards believed to be made currently to these institutions, there is some concentrating effect at play, i.e. this is tending to limit the overall diversity of those applying for awards at least in relation to certain characteristics such as gender and disability.

Table 5.1 Comparison of profiles of eligible researchers in 'Top 10' institutions and RS remit subjects, 2018/19

RS remit subjects	N	%		'Top 10' institutions	N	%
Gender				**Gender**		
Female	5640	42.1%		Female	2540	40.8%
Male	7760	57.9%		Male	3690	59.2%
Age				**Age**		
< 35	8660	64.6%		< 35	4245	68.1%
35-49	4750	35.4%		35-49	1985	31.9%
Nationality				**Nationality**		
UK	5070	37.8%		UK	1950	31.3%
Other EU	3900	29.1%		Other EU	1995	32.0%
RoW	4275	31.9%		RoW	2130	34.2%
Unknown	160	1.2%		Unknown	150	2.4%
Ethnicity of UK nationals as % of known ethnicity				**Ethnicity of UK nationals as % of known ethnicity**		
White	4135	87.0%		White	1545	85.4%
Minority ethnic groups	620	13.0%		Minority ethnic groups	165	14.6%
Asian	*380*	*8.0%*		*Asian*	*25*	*9.1%*
Black	*65*	*1.4%*		*Black*	*60*	*1.4%*
Mixed	*135*	*2.8%*		*Mixed*	*15*	*3.3%*
Other	*40*	*0.8%*		*Other*	*40*	*0.8%*
Disability				**Disability**		
No known disability	13000	96.9%		No known disability	6085	97.8%
Known disability	410	3.1%		Known disability	140	2.2%
Cognitive/learning	*125*	*0.9%*		*Cognitive/learning*	*35*	*0.6%*
Mental health	*70*	*0.5%*		*Mental health*	*25*	*0.4%*
Sensory/Medical/Physical	*135*	*1.0%*		*Sensory/Medical/Physical*	*55*	*0.9%*
Other/multiple	*80*	*0.6%*		*Other/multiple*	*25*	*0.4%*
Employment mode				**Employment mode**		
Full time	11620	86.7%		Full time	5745	92.3%
Part time	1785	13.3%		Part time	480	7.7%
Location of HEI				**Location of HEI**		
England	11480	85.6%		England	5800	93.2%
Scotland	1045	7.8%		Scotland	425	6.8%
Wales	520	3.9%		Wales	0	0.0%
NI	365	2.7%		NI	0	0.0%
Total population	***13405***			***Total population***	***6225***	

It should be noted that one of the institutions in this sub-group, University College London, reports almost all its postdoctoral researchers to be on open-ended contracts, not fixed term. In order to include UCL researchers in this Top 10 analysis, the filter to exclude those with open-ended employment contracts was not applied to its population, unlike other institutions. All other filters were maintained in line with the other institutions.

6. Intersectionalities and other insights

During the data analysis underpinning development of the researcher profiles, it became clear that there are a number of characteristics between which there is significant intersectionality, i.e. the extent of a particular characteristic is more prominent and/or related to the presence of another characteristic. In this chapter we specifically highlight some key intersectionalities that are prominent because they are based on large sub-groups.

6.1. Intersections with gender

A number of strong co-variations arise with gender, including the well-rehearsed variations by gender in participation in several key subjects, on which we do not focus here. The largest difference is in relation to part-time work. The proportion of women in the eligibility profile employed part-time (at 20%) is more than double the proportion of men who are (under 9%). This difference and the others highlighted in this section are shown in Figure 6.1.

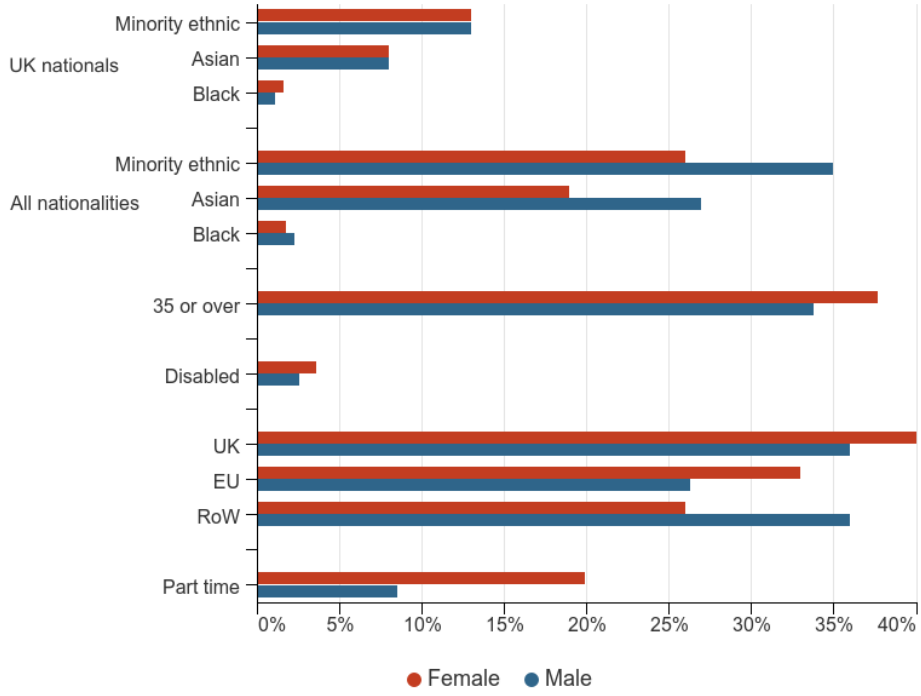


Figure 6.1 Selected characteristics of eligible researchers with gender, in RS remit, 2018/19

Another is disclosure of disability; the 3.6% of women in the profile declaring a disability is nearly half as high again as the 2.6% of men. Within the early-career researcher pool considered here, although women make up the minority overall (42%), numerically there are more women with a disclosed physical or medical disability than men, because of the higher proportion of women who declare this than men.

While the age-based analysis is only preliminary, there is some evidence that on average female researchers in the pool are slightly older, on average, than men, i.e. the proportion of men under 35 is somewhat higher. There is no evidence within these data for why this should be the case, but this would align with more women taking a career break prior to or while they are at the postdoctoral stage. Equally, the difference could result partly from different age

profiles in different subjects, i.e. there are relatively fewer women in physics which as a subject appears to have a younger age profile than overall.

Focusing on ethnicity, the proportions of men and women of UK nationality who are of a minority ethnic background are similar at 13%. While the proportions of this group with an Asian background are also similar for either sex, it is interesting to note that over half of the Black researchers are female. Black researchers constitute 1.6% of UK-nationality female researchers of known ethnic background, whereas amongst men it is even lower at only 1% (remembering that these are very small numbers of individuals). Interestingly, this difference is the reverse of what is seen for the academic workforce as a whole, where 2.1% of male academics are black but only 1.7% of female academics.

As reported earlier, there are also differences in the nationality profile with gender, with more of the women of UK nationality (40%) and EU (33%), and fewer of non-EU nationalities (RoW, 26%), compared with men (36% UK, 26% EU, 36% RoW, respectively).

What is particularly interesting is when the ethnicity analysis is applied to all nationalities combined, rather than solely to UK nationals. The proportion of minority ethnic researchers of all nationalities is significantly higher amongst men (35%) than women (26%, each stated as proportion of known ethnicity). On this basis, the proportion of Asian background is much higher amongst men (27%) than women (18%); this difference is strongly driven by the large number of Asian males from RoW countries in the profile. Although the numbers are modest, in contrast to the UK situation, Black researchers make up a slightly higher proportion of the overall male population here than of their female counterparts. These trends presumably stem from the higher proportion of men within inwardly mobile researchers to the UK.

6.2. International researchers

To highlight co-variations with nationality, in the following analysis we compare the characteristics of UK nationals, EU country nationals and those of non-EU nationality. In many cases the largest differences occur between UK nationals and non-EU.

While 44% of UK researchers in the eligible pool in 2018/19 are female (and 47% of those of EU nationality), this is markedly lower amongst non-EU (RoW, 34%). Figure 6.2 demonstrates this and other key differences for these nationality groupings.

Predictably, there are some very prominent variations in the ethnic composition of those of different nationality groups. While 13% of UK nationals of known ethnicity are of ethnic minority origin, and this is even lower amongst EU nationals (5%), the corresponding proportion is 76% for those of RoW nationalities (which brings into question the label ‘minority ethnic’ in this context). Within this, 62% are of Asian background, far higher than the proportions of Black, mixed or other backgrounds (each at around 5%). More detailed analysis of the ethnic make-up of some specific nationalities could be worthwhile, when so many of the researchers fall into a single group within the high-level ethnicity categorisation used here.

Two other characteristics where large differences occur between UK and non-UK nationals are disability and employment mode. The rate of declared disability amongst UK researchers in the eligible pool is actually 6% (i.e. around double the rate for the overall pool), but it is only just over 1% amongst those of other nationalities. This may reflect that the process of international mobility itself impacts on diversity, i.e. those with a disability may have less confidence that they can be mobile or, possibly, the process by which it happens restricts those who can become mobile internationally.

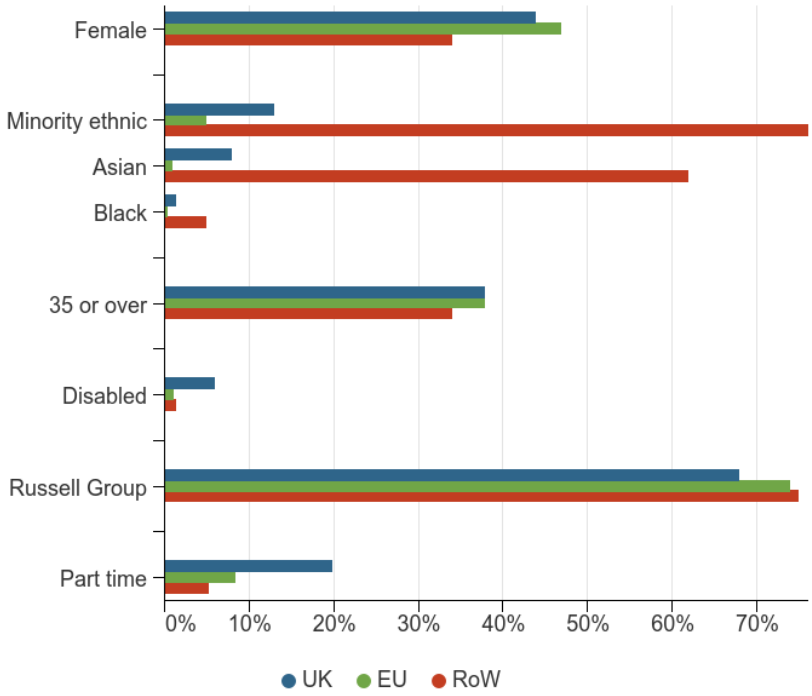
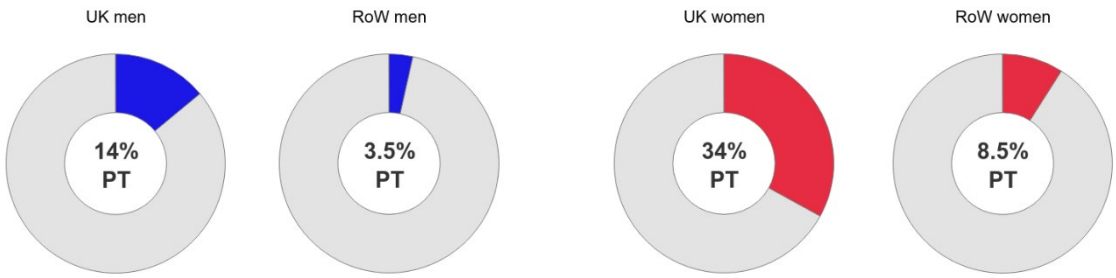


Figure 6.2 Selected characteristics of eligible researchers in RS remit subjects, 2018/19, with broad nationality group

In relation to employment mode, 95% of those of non-EU (RoW) nationalities (and almost 90% of EU nationalities) work full-time, whereas this is just under 80% for UK researchers. When this analysis is extended to include both gender and nationality together, part-time working is most common amongst women of UK nationality at 33%, which is higher than for women of other nationalities (8.5%) or for UK men (14%) and almost ten times the rate amongst men of RoW nationalities (3.5%).



It is also noticeable that a higher proportion of researchers of non-UK nationalities work in Russell Group institutions (up to 75%, compared with 68% of UK researchers). It seems likely that this could result from these large research-intensive institutions being more attractive to inwardly mobile researchers, and/or greater numbers of opportunities within them.

6.3. Other intersectionalities

It is possible to go deeper and deeper into covariances within these data, for which time did not allow in this project. However, one further intersection that we had expected to confirm was a correlation between disability and part-time employment. Overall, this was proven to be observed, with 21% of disabled researchers in the profile working on a part-time basis, which is higher than the 13% overall.

However, when analysed on the basis only of researchers of UK nationality within the profile, the proportions of disabled researchers working part time (34% of women, 15% of men) were scarcely higher than the proportions of UK nationals who are non-disabled (33% and 14%, respectively). This suggests that the apparent correlation and more common part-time work by disabled researchers is not seen amongst UK nationals, but driven almost entirely by differences amongst those of other nationalities. Analysis showed that the proportion of non-UK disabled researchers working part time (although lower than for the UK at only 10%) was indeed nearly double the very low rate of observed amongst non-UK non-disabled researchers. Thus, the expected intersection of part-time work and disability, reported commonly for the overall academic workforce and other workforces, is not at all strongly observed for UK researchers at this early-career stage. This begs questions of the extent to which disabled researchers have the opportunity to work part time at this critical stage in their progression, and also why such differences occur with nationality. It also reinforces the need to consider apparent intersections in some detail in these types of data analysis.

7. Comments and recommendations

7.1. Underlying issues

The aim of this study was to develop diversity profiles of the postdoctoral researchers eligible for RS early-career fellowship awards aimed at facilitating the transition to an independent research career, against which the RS can compare the diversity of those who apply for and obtain the awards. This report has set out how we approached this task in terms of data fields available and proxies needed to map characteristics to eligibility conditions, together with the resulting profiles. In undertaking that work we have noted certain trends and results we considered of interest and highlighted them, together with some focus on the intersectionalities that exist between some diversity characteristics.

The exercise has shown that developing diversity profiles for this population (postdoctoral researchers eligible for these awards) is challenging, despite the existence of data about HE staff systematically collected by HESA. The Staff Record is probably one of the most detailed and complete datasets about HE staff held by any country. Yet a range of approximations and proxies were needed to filter the data and obtain profiles that could roughly represent the eligible researchers. Some of these proxies were very rough and we suspect that not all will agree with the approaches we took.

While the HESA dataset has enormous value in its consistency over recent years and widespread coverage across all HE providers, many of the data elements in it are essentially generic. The 'problem' that we were trying to solve using these data, however, was very specific, trying to establish the profile of staff in a group with very particular criteria (i.e. based on specific eligibility criteria for the fellowship schemes). Many of those criteria did not map simply to data fields within the Staff Record. Viewed purely through the lens of this project, the Staff Record data are not sufficient to establish the diversity profiles we sought with the robustness we would like.

Another issue that surfaces from this detailed data analysis, informed by our work with and about HE researchers, is some inconsistency between approaches taken by different HE providers in relation to some employment issues recorded in the data. This is not so much that some HE providers are not reporting their data correctly, more an issue of interpretation or practice within some institutions. For example, we noted in the data that one large research-intensive institution has a completely different pattern of employment contracts for its early-stage researchers from the others, recording that almost none of its researchers has a fixed-term contract.[15] We are aware that a few much smaller institutions have a similar strategy. This has implications for the RS award eligibility criterion that specifies absence of a permanent employment contract. It also reduces the robustness of the profiles here which have been constructed on the basis of filters applied to the data from all institutions.

In parallel, we noticed a sizeable population of early-career postdoctoral academic staff in STEM subjects who had contracts recorded as 'teaching only'. Anecdotal reports suggest that some providers use such contracts for early-career staff who undertake substantial research, presumably for strategic purposes. For this reason, we elected not to restrict the profile to only

[15] Contracts classified as 'open-ended but subject to funding' – but this nuance is not reflected in the HESA data

those with ‘research only’ contracts (which until now has been quite widely used as a proxy for postdoctoral research staff).

As some providers are using different contract types in this way, it becomes increasing hard to define and identify postdoctoral research staff within the HESA data (unless every provider reports its strategy and then we filter the data separately for every provider, which would be an exceptionally time-consuming additional step).

Some other eligibility criteria (such as length of postdoctoral experience) are simply not currently available in this type of administrative data. Collection of additional data such as the date of a doctorate or other types of information about an individual prior to the snapshot of annual data collection, would be very time-consuming, at a time when HESA is being urged to minimise the requirements it makes of HE providers in terms of data collection. Such issues are being considered currently as part of an overall ‘bureaucracy review’ of the sector. Data held by a prior institution is not ‘portable’ to the new institution when a staff member moves, so it is not feasible to determine issues like duration of experience (or specifically postdoctoral experience) for staff who change institution, whether career breaks have been taken or there has been experience in another sector.

In summary, the heart of the issue is that systematically available data do not have sufficient granularity (and in some cases consistency) to be used to establish robustly a staff profile with the specificity required. The lack of robustness and/or specificity limits potential efforts to use diversity monitoring data to benchmark whether there is under-representation of a particular group and/or whether specific policies or processes are inclusive. Without such rigorous assessment, judgement of whether a process is inclusive (or hinders potential diversity) cannot robustly be made, nor any attempted enhancement of it.

We hope that this report is useful in shedding some light on these difficulties and stimulates discussion within the HE research sector of how ‘better’ data might be achieved. Whether this is through enhanced systematic data collection by a body like HESA, or through sector efforts encouraging and facilitating HE providers to collect other specific data in a common way and to share it for comparability, or both, could be considered.

In the meantime, we hope the profiles generated here will provide a current ‘best available’ benchmark against which the RS can assess the diversity and inclusivity of its early-career award-making.

7.2. Recommendations

- The profiles in this report should be valuable when used as a benchmark with which to assess the diversity profiles of applicants for RS early-career awards and of successful awardees; we are aware the RS will be publishing the results of these comparisons and strongly encourage other funders to follow suit;
- In the absence of direct identification of postdoctoral researchers from HESA staff data currently collected, analysis and comparison of data about eligible researchers would be improved and more robust with some enhancements to the data collected by HESA. We recommend discussion with HESA about possibilities for more specific data collection, for example adjustment of the existing but little used current ‘Research Assistant’ field (with suitable amendment to definitions and terminology) as a means to identify this population;

- It would additionally (or alternatively) be valuable for the sector to agree any specific additional data to be sought through HESA about early-career researchers, including items such as year of doctoral qualification or prior employment details. This would enable more robust information about postdoctoral researchers and their career paths and trajectories, for monitoring not only of diversity but also relating to implementation of the various Concordats that now exist for the research workforce;
- The sector needs to review how ethnicity is considered, monitored and reported in the light of the increasingly international composition of the workforce, in order to underpin with consistent data the efforts being made to counter under-representation of ethnic minorities in the UK academic workforce (an under-representation that continues, in these data);
- The existence of different trends for different ethnic groups also means that monitoring and reporting on the basis of a single aggregated minority ethnic group (such as BAME – Black, Asian and Minority Ethnic) is of diminishing value;
- The stubbornly very low (and only slightly rising) proportion of Black researchers, at just over 1% of UK nationals in the profile and only 2% across all nationalities, stands out – more work is needed to understand and increase the low level of Black participation in STEM doctoral programmes and early research careers to address this;
- The low incidence of reported disability conditions by these early-career researchers needs to be better understood, especially the very low levels of mental health conditions. These stand in stark contrast to the high and increasing levels of mental ill-health reported by students and postgraduate researchers;
- More consistency in the use of contracts (and transparency in this) and reporting of various types of data about staff would be valuable if we are to develop meaningful analyses in future. Emerging knowledge about variations in the use of different types of employment contract for postdoctoral researchers suggests this is clouding efforts to identify this key population and understand its evolving characteristics.

Appendix 1: Data sources, approach to analysis and proxies used

Data about staff and students in UK HE are collected systematically by the Higher Education Statistics Agency (HESA), which publishes a selection of aggregated data and results. Its Staff Record is the key dataset in the context of this project, for which HE providers return certain information about their staff annually. This is by far the most comprehensive source of data available about academic staff in UK universities. While some universities may hold additional data about their staff in their human resources (HR) records or through staff engagement surveys, the HESA Staff Record provides the only systematically collected and presented data that encompass all UK universities, with consistency year-by-year, and that are available for analysis. This dataset has been the basis for published descriptions of the academic workforce such as Advance HE's annual '*Staff Statistical Report*'[16] (formerly published by the Equality Challenge Unit, which was subsumed into Advance HE).

For this project, and to support other diversity and inclusion work, the RS acquired HESA Staff Record data for the years 2008/09 to 2018/19 on the basis of a specification agreed with CRAC and JISC (the organisation that provides data services on behalf of HESA). These data were shared with us in spring 2020 and analysed to produce the profiles in this report.

Although the HESA data are the most comprehensive available, several assumptions had to be made and proxies developed to generate profiles of UK HE staff that map to the RS fellowship eligibility criteria. For potential replicability of these analyses, those assumptions are listed here along with commentary on how proxies were selected and used.

Personal demographics

For most of the key personal characteristics sought, HESA provides unequivocal data as it directly collects these as data items in the Staff Record (and they are well-understood, having been data fields for many years). Thus, information on gender (sex), ethnicity, age, nationality and whether the individual has disclosed a disability is well-established. HESA also collects the highest qualification obtained by an individual and so for the purposes of this analysis the data was filtered to include only those holding a doctoral qualification.

Disciplinary scope

The research disciplines encompassed by the URF and DHF schemes are very wide, reflecting the broad 'natural sciences' RS remit which spans much of the STEM domain. In contrast, the SHDF scheme focuses on biomedical sciences (and other related sciences). The HESA data record primary and subsidiary subject specialisms of staff (called Cost Centres but in practice based on JACS subject categorisation) at Principal Subject Area and Principal Subject level. In consultation with RS staff, we agreed a list of Principal Subjects which approximated to the RS remit subjects (appropriate for the URF and DHF schemes). It was not possible to derive a subsidiary list to match the specific SHDF scheme scope, partly due to difficulty differentiating between biomedical and biological subjects. Many of the results here are therefore for the entire RS remit of subjects.

[16] E.g. Equality+ Higher Education: Staff Statistical Report 2018, Advance HE, 2019: https://www.advance-he.ac.uk/guidance/equality-diversity-and-inclusion/using-data-and-evidence/statistics-reports

Thus, we focused on developing profiles based on the full RS remit of subjects as the core population for this project. In addition, a range of other subject-based profiles were developed for comparison, including profiles for RS 'B-side' subjects (biomedical and biological sciences) and 'A-side' subjects (physical sciences, engineering and technology) plus selected key individual subjects. For simplicity, only primary subject specialisms were analysed.

Employment-related eligibility criteria

The staff eligible for these early-career fellowship schemes are postdoctoral scientists in the appropriate subjects who do not hold a permanent academic position. We made the assumption that they were already academic staff within UK HE, as this is the scope of the Staff Record. Potential international applicants not yet with a position in the UK and any applicants based in industry could not be included in this study.

For the purposes of developing the profiles required, it is problematic that HESA does not directly identify postdoctoral research staff in the Staff Record, although it does indicate academic staff (rather than professional services or administrative), 'employment function' (based on the nature of their contract) and seniority of current post. Each of these data items is now considered in turn in relation to its potential use in defining the profiles sought.

We assumed that only academic staff would be included, although it is possible that this could exclude some staff in technician roles who could be eligible (probably a very small number).

The HESA employment function field for academic staff indicates whether their current employment contract is classified as 'research only', 'teaching only', 'research and teaching' or none of these. As none of these indicates robustly whether an individual is a postdoctoral researcher (also known as 'research staff'), several other studies have simply considered all those with 'research only' contracts to be in this category.[17,18] However, that approach will include some more senior staff such as research fellows and research professors. If used in conjunction with a field on seniority, it might be expected to provide a useful strategy to define postdoctoral staff. However, there is increasing evidence that some HE institutions employ postdoctoral research staff on other types of contract (including 'teaching only' contracts), partly in response to requirements for REF reporting. In that knowledge, and not wishing to exclude postdoctoral researchers holding junior teaching positions, we elected not to follow the 'research only' contracts approach. After a series of trial profiles, we chose to include staff with research only, teaching only or research and teaching contracts.

The seniority of post obviously gives insight into whether they are an 'early career' researcher. Since 2011/12, HESA has adopted a classification of roles in HE which runs from Level A (Vice-Chancellor) downwards, devised by UCEA.[19] We have used this classification previously to analyse the level of posts gained by alumni of fellowship schemes, within evaluations. The levels of most interest to this study are:

- J – '*Team Leader (Professional, Technical, Administrative)*' which includes Research Fellows on named fellowship schemes, Senior Research Fellows, also certain Lecturers and Senior Lecturers;

[17] Careers in Research Online Survey: https://www.vitae.ac.uk/impact-and-evaluation/cros

[18] https://www.liverpool.ac.uk/researcher/prosper/blog/prosper/whos-who-profiling-uk-postdoc-population/

[19] Universities and Colleges Employers Association

- K – '*Senior Professional (Technical)*' which includes Lecturers, Research Fellows, Researchers and Teaching Fellows, hence covering many types of postdoctoral research and junior teaching positions; and

- L - '*Senior Administrative staff (Professional/Technical)*' within which there are more junior research posts and teaching posts.

To generate the profiles sought, we chose to include only staff at level K or L. While this excludes some staff in Level J who are eligible for the fellowships, we know that Level J also includes researchers already on fellowships schemes such as the URF or SHDF. Also, we know from evaluations that a significant proportion of the first posts gained by staff after completion of one of these fellowships are also within Level J, including some Senior Research Fellows. Because it is not possible to sub-divide Level J staff (which is numerically a large group), we decided to exclude Level J staff from the profile for these reasons, in order to focus on those in early career who are eligible for an RS research fellowship. This undoubtedly produces a smaller population within the profiles than the actual number of eligible postdoctoral research staff.

The HESA data directly identify whether an individual's current employment contract is open-ended or fixed term, so it was easy to filter out those with a permanent position (i.e. an open-ended contract) to match the eligibility criteria. We did note, however, that at least one institution recorded almost all its postdoctoral research staff as having an open-ended contract, believed to be because it records them as 'open-ended subject to funding' (which we would not consider as permanent). For the purposes of the core profiles, this complication was simply overlooked.

Postdoctoral experience

Arguably the most difficult eligibility criterion to approximate was the length of postdoctoral experience, which cannot be ascertained robustly from the HESA data. The criterion is also intended to exclude time away from research. Age is not a strong indicator because doctoral study can occur at different career stages (and age itself is not an eligibility criterion). In practice, however, staff aged over 50 were filtered out, being highly unlikely to be 'early-career' researchers (accepting that some individuals have highly diverse career pathways).

While staff with a doctoral qualification are clearly identified, the length of time since they obtained that qualification (i.e. duration of postdoctoral experience) is much more elusive, as the date of qualification is not recorded. In the absence of specific knowledge of the date of doctoral qualification, the only data items in the Staff Record that could give insights into extent of experience are duration of current employment contract and duration of employment with current institution (both of which are calculated based on start dates). It was agreed with the RS staff that the latter of these was the best, albeit very rough, proxy available for postdoctoral experience, so a filter was set to include only those who had been employed by their institution for 8 years or less. We acknowledge that this entirely misses any experience gained at a previous institution (and hence could underestimate postdoctoral experience) and also the possibility that the doctorate was gained while employed at the institution (which would overestimate it). Nonetheless, this appeared to be the only realistic proxy available, and its value was almost certainly enhanced when used in combination with the other employment-related filters above.

Given that it is such a rough proxy for experience, it was agreed there would be little merit in trying to separate those eligible for the DHF (0 to 6 years postdoctoral experience) from URF (3 to 8 years) or SHDF (no specified years of experience) schemes, and so a single profile was generated to cover all three together.

Selection and testing of filter combinations

We generated a series of initial profiles of staff based on different combinations of these filters and proxies and shared these with RS project staff, considering the total size of the derived population in each case and the diversity profile. For example, when the 'research only' contract filter was applied together with the job Levels K and L and fixed-term contract, the resulting population was much smaller than expected. As hinted earlier, closer investigation confirmed quite a large group of early-career academics in STEM with teaching only contracts, whom we did not want to exclude, so we did not restrict the profile only to those on research only contracts.

It was also noticeable, however, that many demographic aspects of the profile did not change much across the different options tried, which gives some comfort towards believing that the profile we selected could be reasonably representative of the population targeted (i.e. use of a different filter did not markedly adjust the diversity profile).

Our final, pragmatic selection for the 'core' profile for RS remit subjects was based on academic staff with all of the following characteristics:

- A STEM discipline within the overall RS remit subjects;
- A 'research only', 'teaching only' or 'research and teaching' contract;
- Current employment position at Level K or L;
- Current employment on a fixed-term contract;[20]
- Up to 8 years employment duration with current institution;
- Age under 50 years.

Combining these filters for the 2018/19 Staff Record resulted in a population of just over 13,400 staff. This is smaller than the population we were expecting (based on our knowledge through other studies), probably due to exclusion of Level J staff. Ideally, we would like to have been able to include some of that group, but not all (for the reasons stated above) – but this was not possible using these data.

Presentation of profile data

The core profile was based on the Staff Record for the 2018/19 year, the most recent available, and profiles generated using the same filters for a range of sub-groups. To consider changes over time, comparative profiles were developed for a selection of years covered by the data acquired: 2017/18, 2015/16, 2013/14 and 2008/09, which are respectively 1, 3, 5 and 10 years prior to the most recent year.

As required for publication of results derived from HESA data, the size of any sub-group reported has to be rounded to the nearest 5 prior to presentation as a numerical result or a percentage. For this reason, some results appear as zero (e.g. 0%) even if there are 1 or 2

[20] Data for staff from University College London were treated in a bespoke fashion in certain analyses, as highlighted in the relevant chapter

individuals in that group; this could apply, for example, to the proportion of Black researchers within certain sub-groups as their numbers tend to be particularly small. It also means that in some tables in this report the sum of sub-groups with a certain characteristic may not reach 100% or be slightly different from the total number when aggregated. The data were obtained from HESA on a full-time equivalent basis, and all data here are presented unweighted.

Appendix 2: Profile of researchers eligible for RS early-career schemes, with time

	2018/19		2017/18		2015/16		2013/14		2008/09	
Population	**13405**		**13480**		**12930**		**12350**		**8750**	
Gender										
Female	5640	42.1%	5720	42.4%	5505	42.6%	5285	42.8%	3745	42.8%
Male	7760	57.9%	7755	57.5%	7425	57.4%	7065	57.2%	5005	57.2%
Other	5	0.0%	5	0.0%	0	0.0%	0	0.0%	0	0.0%
Age										
< 35	8660	64.6%	8720	64.7%	8520	65.9%	7955	64.4%	5290	60.4%
35-49	4750	35.4%	4760	35.3%	4410	34.1%	4400	35.6%	3465	39.6%
Nationality										
UK	5070	37.8%	5270	39.1%	5390	41.7%	5750	46.5%	3825	43.7%
Other EU	3900	29.1%	4090	30.3%	3960	30.6%	3485	28.2%	2240	25.6%
Rest of World	4275	31.9%	4010	29.7%	3460	26.7%	2960	24.0%	2565	29.3%
Unknown	160	1.2%	115	0.9%	125	1.0%	160	1.3%	120	1.4%
Ethnicity (of UK nationals)										
White	4135	81.6%	4380	83.1%	4435	82.4%	4705	81.9%	2885	75.4%
Minority ethnic groups	620	12.2%	595	11.3%	600	11.1%	625	10.9%	490	12.8%
Asian	*380*	*7.5%*	*370*	*7.0%*	*375*	*7.0%*	*410*	*7.1%*	*330*	*8.6%*
Black	*65*	*1.3%*	*55*	*1.0%*	*50*	*0.9%*	*65*	*1.1%*	*45*	*1.2%*
Mixed	*135*	*2.7%*	*130*	*2.5%*	*130*	*2.4%*	*90*	*1.6%*	*80*	*2.1%*
Other	*40*	*0.8%*	*40*	*0.8%*	*45*	*0.8%*	*60*	*1.0%*	*35*	*0.9%*
Unknown	315	6.2%	295	5.6%	350	6.5%	415	7.2%	450	11.8%

	2018/19		2017/18		2015/16		2013/14		2008/09	
Ethnicity (all nationalities)										
White	8450	63.0%	8880	65.9%	8840	68.4%	8550	69.2%	5575	63.7%
Minority ethnic groups	3820	28.5%	3550	26.3%	3105	24.0%	2655	21.5%	2130	24.3%
Asian	*2875*	*21.4%*	*2675*	*19.8%*	*2320*	*17.9%*	*1945*	*15.8%*	*1585*	*18.1%*
Black	*260*	*1.9%*	*215*	*1.6%*	*185*	*1.4%*	*180*	*1.5%*	*135*	*1.5%*
Mixed	*400*	*3.0%*	*375*	*2.8%*	*335*	*2.6%*	*235*	*1.9%*	*205*	*2.3%*
Other	*285*	*2.1%*	*285*	*2.1%*	*265*	*2.0%*	*290*	*2.3%*	*210*	*2.4%*
Unknown	1140	8.5%	1050	7.8%	985	7.6%	1145	9.3%	1050	12.0%
Disability										
Known disability	410	3.1%	390	2.9%	365	2.8%	325	2.6%	150	1.7%
Cognitive/learning	*125*	*0.9%*	*120*	*0.9%*	*115*	*0.9%*	*80*	*0.6%*	*25*	*0.3%*
Mental health	*70*	*0.5%*	*60*	*0.4%*	*45*	*0.3%*	*30*	*0.2%*	*5*	*0.1%*
Sensory/Medical/Physical	*135*	*1.0%*	*120*	*0.9%*	*110*	*0.9%*	*110*	*0.9%*	*55*	*0.6%*
Other/multiple	*80*	*0.6%*	*90*	*0.7%*	*95*	*0.7%*	*105*	*0.9%*	*65*	*0.7%*
No known disability	13000	96.9%	13090	97.1%	12570	97.2%	12025	97.4%	8600	98.3%
Russell Group	9700	72.4%	9625	71.4%	9110	70.5%	8660	70.1%	6170	70.5%
Location of HEI										
England	11480	85.6%	11560	85.8%	11190	86.5%	10720	86.8%	7220	82.5%
Scotland	1045	7.8%	1075	8.0%	1040	8.0%	835	6.8%	890	10.2%
Wales	520	3.9%	535	4.0%	465	3.6%	565	4.6%	415	4.7%
N Ireland	365	2.7%	305	2.3%	240	1.9%	225	1.8%	230	2.6%
Mode of employment										
Full time	11620	86.7%	11740	87.1%	11240	86.9%	10380	84.0%	7870	89.9%
Part time	1785	13.3%	1740	12.9%	1690	13.1%	1975	16.0%	880	10.1%

Appendix 3: RS A-side and B-side subjects profiles

A-side subjects

	2018/19		2017/18		2015/16		2013/14		2008/09	
Population	**7295**		**7480**		**7080**		**6580**		**4145**	
Gender										
Female	2215	30.4%	2335	31.2%	2240	31.6%	2155	32.8%	1185	28.6%
Male	5080	69.6%	5140	68.7%	4845	68.4%	4425	67.2%	2965	71.4%
Other	0	0.0%	5	0.1%	0	0.0%	0	0.0%	0	0.0%
Age										
< 35	4990	68.4%	5070	67.8%	4900	69.2%	4440	67.4%	2580	62.2%
35-49	2310	31.6%	2410	32.2%	2185	30.8%	2145	32.6%	1570	37.8%
Nationality										
UK	2310	31.6%	2560	34.2%	2590	36.5%	2805	42.6%	1535	37.0%
Other EU	2060	28.2%	2190	29.3%	2150	30.3%	1845	28.0%	1035	25.0%
Rest of World	2865	39.2%	2680	35.8%	2285	32.2%	1840	27.9%	1515	36.6%
Unknown	65	0.9%	50	0.7%	65	0.9%	95	1.4%	60	1.4%
Ethnicity (of UK nationals)										
White	1820	78.8%	2050	80.1%	2070	79.9%	2260	80.7%	1145	74.6%
Minority ethnic groups	325	14.1%	335	13.1%	325	12.5%	340	12.1%	190	12.4%
Asian	*195*	*8.4%*	*210*	*8.2%*	*200*	*7.7%*	*225*	*8.0%*	*125*	*8.1%*
Black	*35*	*1.5%*	*30*	*1.2%*	*30*	*1.2%*	*40*	*1.4%*	*20*	*1.3%*
Mixed	*70*	*3.0%*	*70*	*2.7%*	*65*	*2.5%*	*40*	*1.4%*	*30*	*2.0%*
Other	*25*	*1.1%*	*25*	*1.0%*	*30*	*1.2%*	*35*	*1.3%*	*15*	*1.0%*
Unknown	165	7.1%	175	6.8%	195	7.5%	200	7.1%	200	13.0%

	2018/19		2017/18		2015/16		2013/14		2008/09	
Ethnicity (all nationalities)										
White	4135	56.7%	4200	58.5%	4495	63.4%	4335	65.8%	2420	58.3%
Minority ethnic groups	2505	34.3%	2340	32.6%	2015	28.4%	1630	24.8%	1215	29.3%
Asian	*1940*	*26.6%*	*1790*	*24.9%*	*1535*	*21.7%*	*1220*	*18.5%*	*945*	*22.7%*
Black	*150*	*2.1%*	*135*	*1.9%*	*115*	*1.6%*	*105*	*1.6%*	*80*	*1.9%*
Mixed	*230*	*3.2%*	*230*	*3.2%*	*205*	*2.9%*	*130*	*2.0%*	*100*	*2.4%*
Other	*185*	*2.5%*	*185*	*2.6%*	*160*	*2.3%*	*170*	*2.6%*	*95*	*2.3%*
Unknown	655	9.0%	640	8.9%	575	8.1%	620	9.4%	515	12.4%
Disability										
Known disability	205	2.8%	205	2.7%	200	2.8%	180	2.7%	65	1.7%
Cognitive/learning	*55*	*0.8%*	*55*	*0.7%*	*60*	*0.8%*	*45*	*0.7%*	*10*	*0.2%*
Mental health	*40*	*0.5%*	*35*	*0.5%*	*30*	*0.4%*	*20*	*0.3%*	*5*	*0.1%*
Sensory/Medical/Physical	*45*	*0.6%*	*40*	*0.5%*	*25*	*0.4%*	*25*	*0.4%*	*55*	*1.3%*
Other/multiple	*65*	*0.9%*	*75*	*1.0%*	*85*	*1.2%*	*90*	*1.4%*	*0*	*0.0%*
No known disability	7095	97.2%	7275	97.3%	6885	97.2%	6400	97.3%	4080	98.3%
Russell Group	5515	75.6%	5675	75.9%	5230	73.9%	4745	72.1%	2865	69.1%
Location of HEI										
England	6265	85.8%	6420	85.9%	6160	86.9%	5815	88.4%	3410	82.2%
Scotland	620	8.5%	650	8.7%	630	8.9%	455	6.9%	445	10.7%
Wales	255	3.5%	255	3.4%	190	2.7%	210	3.2%	185	4.5%
N Ireland	160	2.2%	150	2.0%	105	1.5%	95	1.4%	110	2.7%
Mode of employment										
Full time	6585	90.3%	6760	91.7%	6340	89.5%	5640	85.6%	3835	92.5%
Part time	710	9.7%	610	8.3%	740	10.5%	945	14.4%	310	7.5%

B-side subjects

	2018/19		2017/18		2015/16		2013/14		2008/09	
Population	**6110**		**6000**		**5850**		**5770**		**4605**	
Gender										
Female	3425	56.1%	3385	56.4%	3265	55.9%	3130	54.2%	2465	53.5%
Male	2680	43.9%	2615	43.6%	2580	44.1%	2640	45.8%	2140	46.5%
Other	5	0.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Age										
< 35	3670	60.1%	3650	60.8%	3620	61.9%	3515	60.9%	2710	58.8%
35-49	2440	39.9%	2350	39.2%	2225	38.1%	2255	39.1%	1895	41.2%
Nationality										
UK	2760	45.2%	2710	45.1%	2800	47.9%	2945	51.0%	2290	49.7%
Other EU	1840	30.1%	1900	31.6%	1810	31.0%	1640	28.4%	1205	26.2%
Rest of World	1410	23.1%	1330	22.1%	1175	20.1%	1120	19.4%	1050	22.8%
Unknown	95	1.6%	65	1.1%	60	1.0%	65	1.1%	60	1.3%
Ethnicity (of UK nationals)										
White	2315	83.9%	2330	86.0%	2365	84.6%	2445	83.0%	1740	76.0%
Minority ethnic groups	295	10.7%	260	9.6%	275	9.8%	285	9.7%	300	13.1%
Asian	*185*	*6.7%*	*160*	*5.9%*	*175*	*6.3%*	*185*	*6.3%*	*205*	*9.0%*
Black	*30*	*1.1%*	*25*	*0.9%*	*20*	*0.7%*	*25*	*0.8%*	*25*	*1.1%*
Mixed	*65*	*2.4%*	*60*	*2.2%*	*65*	*2.3%*	*50*	*1.7%*	*50*	*2.2%*
Other	*15*	*0.5%*	*15*	*0.6%*	*15*	*0.5%*	*25*	*0.8%*	*20*	*0.9%*
Unknown	150	5.4%	120	4.4%	155	5.5%	215	7.3%	250	10.9%

	2018/19		2017/18		2015/16		2013/14		2008/09	
Ethnicity (all nationalities)										
White	4315	70.6%	4680	74.3%	4345	74.3%	4215	73.1%	3155	68.5%
Minority ethnic groups	1315	21.5%	1210	19.2%	1090	18.6%	1025	17.8%	915	19.9%
Asian	*935*	*15.3%*	*885*	*14.0%*	*785*	*13.4%*	*725*	*12.6%*	*640*	*13.9%*
Black	*110*	*1.8%*	*80*	*1.3%*	*70*	*1.2%*	*75*	*1.3%*	*55*	*1.2%*
Mixed	*170*	*2.8%*	*145*	*2.3%*	*130*	*2.2%*	*105*	*1.8%*	*105*	*2.3%*
Other	*100*	*1.6%*	*100*	*1.6%*	*105*	*1.8%*	*120*	*2.1%*	*115*	*2.5%*
Unknown	485	7.9%	410	6.5%	410	7.0%	525	9.1%	535	11.6%
Disability										
Known disability	205	3.3%	185	3.1%	165	2.8%	145	2.5%	85	1.8%
Cognitive/learning	*70*	*1.1%*	*65*	*1.1%*	*55*	*0.9%*	*35*	*0.6%*	*15*	*0.3%*
Mental health	*30*	*0.5%*	*25*	*0.4%*	*15*	*0.3%*	*10*	*0.2%*	*0*	*0.0%*
Sensory/Medical/Physical	*90*	*1.5%*	*80*	*1.3%*	*85*	*1.5%*	*85*	*1.5%*	*65*	*1.4%*
Other/multiple	*15*	*0.2%*	*15*	*0.3%*	*10*	*0.2%*	*15*	*0.3%*	*5*	*0.1%*
No known disability	5905	96.6%	5815	96.9%	5685	97.2%	5625	97.5%	4520	98.2%
Russell Group	4185	68.5%	3950	65.8%	3880	66.3%	3915	67.9%	3305	71.8%
Location of HEI										
England	5215	85.4%	5140	85.7%	5030	86.0%	4905	85.0%	3810	82.7%
Scotland	425	7.0%	425	7.1%	410	7.0%	380	6.6%	445	9.7%
Wales	265	4.3%	280	4.7%	275	4.7%	355	6.2%	230	5.0%
N Ireland	205	3.4%	155	2.6%	135	2.3%	130	2.3%	120	2.6%
Mode of employment										
Full time	5035	82.4%	4980	81.5%	4900	83.8%	4740	82.1%	4035	87.6%
Part time	1075	17.6%	1130	18.5%	950	16.2%	1030	17.9%	570	12.4%

Appendix 4: Profiles for selected subjects, 2018/19

	RS remit subjects		Physics		Chemistry		Engineering		Computing & Maths	
Population	**13405**		**1275**		**1080**		**2030**		**1690**	
Gender										
Female	5640	42.1%	290	22.7%	350	32.4%	458	22.8%	475	28.1%
Male	7760	57.9%	985	77.3%	730	67.6%	1550	77.2%	1215	71.9%
Other	5	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Age										
< 35	8660	64.6%	940	73.7%	790	73.1%	1385	68.2%	1060	62.5%
35-49	4750	35.4%	335	26.3%	290	26.9%	645	31.8%	635	37.5%
Nationality										
UK	5070	37.8%	425	33.3%	415	38.4%	490	24.1%	530	31.4%
Other EU	3900	29.1%	420	32.9%	320	29.6%	455	22.4%	500	29.6%
Rest of World	4275	31.9%	405	31.8%	335	31.0%	1075	53.0%	640	37.9%
Unknown	160	1.2%	25	2.0%	10	0.9%	10	0.5%	20	1.2%
Ethnicity (of UK nationals)										
White	4135	81.6%	365	85.9%	355	85.5%	355	72.4%	420	79.2%
Minority ethnic groups	620	12.2%	30	7.1%	40	9.6%	90	18.4%	75	14.2%
Asian	*380*	*7.5%*	*20*	*4.7%*	*25*	*6.0%*	*60*	*12.2%*	*45*	*8.5%*
Black	*65*	*1.3%*	*0*	*0.0%*	*0*	*0.0%*	*10*	*2.0%*	*10*	*1.9%*
Mixed	*135*	*2.7%*	*10*	*2.4%*	*10*	*2.4%*	*10*	*2.0%*	*15*	*2.8%*
Other	*40*	*0.8%*	*0*	*0.0%*	*5*	*1.2%*	*10*	*2.0%*	*5*	*0.9%*
Unknown	315	6.2%	30	7.1%	20	4.8%	45	9.2%	35	6.6%

	RS remit subjects		Physics		Chemistry		Engineering		Computing & Maths	
Ethnicity (all nationalities)										
White	8450	63.0%	835	65.5%	720	66.7%	865	42.6%	985	58.1%
Minority ethnic groups	3820	28.5%	305	23.9%	290	26.9%	965	47.5%	555	32.7%
Asian	*2875*	*21.4%*	*235*	*18.4%*	*240*	*22.2%*	*775*	*38.2%*	*410*	*24.2%*
Black	*260*	*1.9%*	*5*	*0.4%*	*15*	*1.4%*	*65*	*3.2%*	*40*	*2.4%*
Mixed	*400*	*3.0%*	*45*	*3.5%*	*20*	*1.9%*	*55*	*2.7%*	*60*	*3.5%*
Other	*285*	*2.1%*	*20*	*1.6%*	*15*	*1.4%*	*70*	*3.4%*	*45*	*2.7%*
Unknown	1140	8.5%	135	10.6%	70	6.5%	200	9.9%	155	9.1%
Disability										
Known disability	410	3.1%	40	3.1%	30	2.8%	40	2.0%	65	3.8%
Cognitive/learning	*125*	*0.9%*	*15*	*1.2%*	*10*	*0.9%*	*15*	*0.7%*	*20*	*1.2%*
Mental health	*70*	*0.5%*	*10*	*0.8%*	*5*	*0.5%*	*5*	*0.2%*	*10*	*0.6%*
Sensory/Medical/Physical	*135*	*1.0%*	*10*	*0.8%*	*10*	*0.9%*	*10*	*0.5%*	*25*	*1.5%*
Other/multiple	*80*	*0.6%*	*5*	*0.4%*	*5*	*0.5%*	*10*	*0.5%*	*10*	*0.6%*
No known disability	13000	96.9%	1235	96.9%	1050	97.2%	1990	98.0%	1630	96.2%
Russell Group	9700	72.4%	945	74.1%	820	75.9%	1400	69.0%	1130	66.9%
Location of HEI										
England	11480	85.6%	1070	83.9%	910	84.3%	1500	83.8%	1500	88.8%
Scotland	1045	7.8%	125	9.8%	80	7.4%	180	10.1%	110	6.5%
Wales	520	3.9%	40	3.1%	65	6.0%	70	3.9%	40	2.4%
N Ireland	365	2.7%	40	3.1%	25	2.3%	40	2.2%	40	2.4%
Mode of employment										
Full time	11620	86.7%	1205	94.5%	1005	93.1%	1860	91.6%	1420	84.0%
Part time	1785	13.3%	70	5.5%	75	6.9%	170	8.4%	270	16.0%

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