CRAC
The Career Development Organisation

Royal Society Early-career Research Fellowships:

Career Pathway Tracker 2024

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vitae realising the potential of researchers

An independent report commissioned by The Royal Society

By the Careers Research & Advisory Centre (CRAC) Ltd, supported by the Institute for Employment Studies (IES)

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About CRAC

The Careers Research & Advisory Centre (CRAC), registered as a charity in 1964, provides research, expertise and innovation services for all those who support career development, at all ages and across all sectors. CRAC's research and consultancy work focuses on career-related learning, employability development and career transitions, including STEM and researcher careers. CRAC also owns and manages the Vitae programme, which enhances support for the professional and career development of researchers and, increasingly, development of the research environment and improvement in research culture.

About IES

The Institute for Employment Studies (IES) is an independent, international centre of research and consultancy on public employment policy and human resources (HR) issues. It works closely with employers in all sectors, government departments, agencies, professional bodies and associations. IES is a focus of knowledge and practical experience in employment and training policy, the operation of labour markets, and HR planning and development. IES is a not-for-profit organisation with research specialists and consultants from a range of countries, and conducts projects focused on UK, European and International issues

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1. Executive summary

Background

At the core of the Royal Society's grant programmes are its early-career fellowship schemes:

- University Research Fellowship (URF) – one of the UK's pre-eminent early-career fellowships, which for over 40 years has provided long-term support to talented early-career scientists to help them transition to an independent research leadership career;
- Dorothy Hodgkin Fellowship (DHF) – aimed to enable outstanding scientists requiring a flexible work pattern to take their first steps into an independent research career; and
- Sir Henry Dale Fellowship (SHDF) – awarded in partnership by the Royal Society and Wellcome Trust between 2012 and 2021, similar to a URF but specifically to support early-career researchers working on important topics in biomedical fields or public health.

Over 500 scientists are currently being supported through these three programmes and there are now around 1500 'alumni' who have completed such an award). The Royal Society initiated the 'Career Pathway Tracker' project in 2017 with the following principal aims in relation to alumni of these programmes:

- Determining the long-term impact of these early-career research fellowships on the awardees' careers and their scientific research;
- Identifying the contributions these research fellows have made (or are making) to the wider scientific landscape, such as through international appointments, leadership roles, influencing science policy and commercial/innovation success;
- Understanding the career pathways of funded early-career researchers (alumni);
- Providing evidence to improve the provision of support and opportunities that are offered to awardees within these schemes.

The first Career Pathway Tracker study and report were completed by CRAC in 2018, covering the URF and DHF schemes to that point.[1] In 2023 CRAC was commissioned to undertake a second iteration of the project, which also incorporated SHDF alumni. This new study was an opportunity to investigate the onward career trajectories and experiences of URF and DHF awardees five years on, and to identify the progress, achievements and experiences of alumni completing awards since the first study.

2023/24 surveys and participation

A similar approach to the 2018 study was implemented for 'new' alumni since 2017, using a slightly updated survey instrument (containing a few refinements but retaining many questions for consistency and potential comparability of data). This survey was targeted to 193 alumni newly in scope and a further 280 alumni who had not replied to the 2018 study. In parallel, a separate survey was deployed for those who had responded to the first study and consented to be re-contacted, comprising a further 825 alumni. In the survey version they received, they were offered the opportunity to review and update the responses they had given in 2018, as well as being requested to answer certain new or revised questions.

After data cleaning and removal of a handful of responses from ineligible respondents, 245 responses to the 'new' survey were received (from 473 invitations, i.e. a 52% response rate), comprising 140 recent alumni (for whom this was a 73% response rate) plus 105 responses

[1] The project took place in 2017-2018 but report was published in 2018, hence referred to as the 2018 study: https://royalsociety.org/-/media/grants/career-pathway-tracker/crac-data-report.pdf

from those who had not responded in 2017. 543 responses were obtained to the survey targeted to the 825 existing alumni (a 66% response rate). This means a total of 1142 alumni have responded at some point so far, from 1370 who have been invited to do so, although a further c.300 (mostly from the early period of the URF scheme) have been unreachable through the surveys as no current contact data are held.

In practice, the accumulated data cover alumni from the three different fellowship schemes which have existed over different periods. Analysis of the survey data was approached primarily by scheme and, where feasible, also by completion period. Although this reduced sample sizes for relevant groups, results were more meaningful than would be derived across schemes and periods. This report contains results from analysis of these survey data.

Scheme impacts

The 2018 Career Pathway Tracker report provided strong evidence for the impact of URF awards based on survey results from alumni across the lifetime of the scheme at that point. In the current study, c.100 alumni respondents who have since completed an award are also included, offering an updated cumulative snapshot of scheme outcomes plus insights into the outcomes for those in the most recent cohorts.

The results continue to reinforce and confirm the very positive outcomes and impacts recorded in 2018. Dominantly, URF alumni are continuing in academic careers and establishing positions of independent research leadership. Three quarters have reached a Professor-level or more senior post, and there is some evidence that these posts are being reached more quickly than observed in 2018. Almost all have achieved metrics of research leadership, in terms of published outputs, winning grant funding, hiring research staff and supervising successful doctoral students. There is also evidence of the contributions many are making in their fields and institutions, for which large numbers have obtained external recognition, as well as in training the next generation of researchers. Newly introduced questions shed more light into the research groups they are leading, the near-ubiquity of international collaborations and the commercialisation that is emerging from up to one third of URF alumni respondents.

As the DHF scheme matures, there is increasing evidence not only that DHF alumni have been achieving the “first steps towards independent research careers” that the scheme set out to support, but that many have progressed further to positions of research leadership. Nearly 90% of alumni responding to the survey have remained on an academic trajectory and were research-active, while almost all the rest work in STEM industries/organisations, suggesting that the flexible support the award offered them facilitated such progression and retention within science. Just over half, to date, of those on academic career paths have reached the level of Professor or higher, and 95% have a permanent position. Almost all DHF research-active alumni have published a significant paper as a PI, 90% have won major research grants, and over 90% have recruited research staff and supervised a doctoral student; at the point of survey two thirds were leading a research group.

Meanwhile, a modest number of SHDF alumni (35 respondents) are now also included, for many of whom we report research-related metrics very similar to those of their recent URF counterparts. Almost 90% had transitioned to academic research posts in the UK, were leading research groups and undertaking significant scientific research, although relatively fewer of them had secured a permanent contract and/or a Professor-level post yet. This will be investigated further in future surveys when more SHDF alumni are being tracked this way.

Overall, however, there is an array of evidence that all three of these early-career schemes are delivering either the long-term impacts desired or shorter-term outcomes that align with achievement of those impacts in the longer term.

Mobility, international collaborations and retention

New insights have been gained into the international mobility of researchers funded through these schemes. As many as half of URF alumni respondents had spent some time working overseas, most commonly prior to their award, and this proportion was higher still amongst the most recent alumni. Up to one fifth had spent at least a few months abroad during the award itself. Post-award, over 80% of URF alumni respondents reported at least one current international collaboration.

Compared with international mobility, experiences of work within other sectors appear to be far less common for those in academic careers. Around one in 10 of those now in academic positions report that they have spent at least a few months working in another industrial sector at some point, across the schemes. Instances of time spent in another sector during the award itself were generally very rare. There was evidence for some correlation between spending time in industry prior to or during an award and making a career shift to industry after the award (i.e. working in another sector).

The proportions of alumni responding to the survey who work in sectors other than academia/HE remain low (4% of URFs, 6% of SHDFs and around 10% of DHFs), but the Career Pathway Tracker project and surveys to date are believed to under-represent such alumni. Maintaining better engagement with alumni across all sectors is recommended, and future iterations of this tracking study may require alternative strategies to provide better coverage of those in non-academic sectors.

There was clear evidence that the schemes retain UK researchers in the country, who would otherwise move abroad, as well as attracting and retaining international researchers. This net positive retention effect is strong initially (for at least 10 years post-award) but eventually dissipates as many international scientists ultimately return home or move to third countries and a minority of UK scientists emigrate in mid- or late-career. Nonetheless, for the typical awardee, there appears on average to be a net positive retention effect for 20-25 years of their career, which presumably includes when they are most productive.

Training the next generation of researchers

Responses from URF and DHF alumni highlight their pride in supporting and training other researchers, both as doctoral students and research staff they hire and manage. At least three quarters of research-active URF alumni, two thirds of DHF alumni and nine out of 10 SHDF alumni lead research groups. Cumulatively, alumni responding to the survey have supervised nearly 10,000 doctoral students and recruited and managed over 7000 postdoctoral staff. As such, these are very significant contributions to development of the UK's research capacity, and these next generations of researchers will in turn achieve many and varied scientific, economic or societal impacts and achievements.

Career breaks and scheme flexibility

The overwhelming majority of URF and SHDF alumni in this study undertook their award on a full-time basis although this has begun to decrease slightly, with 4% of recent URF alumni having undertaken their award part-time. Higher proportions (around 30%) of DHF alumni worked part-time either throughout or for part of their award, as expected from an award that

targets those needing more flexible support. While the URF and DHF award packages are now converging, we judge that the DHF scheme continues to be necessary (i.e. providing a 'more flexible' alternative to the URF) for the foreseeable future.

Overall, a break in career at some stage for personal reasons such as childbirth or caring responsibilities has been becoming more common, albeit more so for DHF alumni (85% of whom have taken some kind of break at some career stage to date) than others (41% of URFs, although 63% of recent URFs). Breaks for parental or caring purposes were more common during awards than either beforehand or afterwards, potentially reflecting both the flexibility available in these award schemes but also the life stage at which awards tend to occur. There is evidence for an increasing demand for and instances of such breaks, particularly from men, reinforcing the need for scheme eligibility criteria to take account of such contextual factors and for award benefits to be available flexibly.

Future considerations for the Career Pathway Tracker

The survey research undertaken for this second report in the Career Pathway Tracker project confirms that ongoing engagement with alumni of these schemes is practicable, contributing to a longitudinal picture. High response rates to our surveys have continued, which seem to reflect willingness of the alumni to continue to engage and provide information about their career progression, achievements and the impact of these awards upon these. That said, response rates amongst recent alumni are somewhat weaker.

Two issues are emerging for consideration. One is that there is an increasing number of URF alumni who have now moved into retirement, raising the question of whether to try to continue to engage them in the project and learn about their activities beyond formal employment. The second is how to sustain engagement with alumni who entered pathways other than academia/HE, who are currently under-represented in the Career Pathway Tracker project. We recommend the Society considers how to engage with scheme alumni in all sectors more effectively, while alternative methodologies may be required to obtain some career information about alumni who are not reached through the surveys.

Part A – Early career research fellowship tracking and evaluation

2. The Career Pathway Tracker project

2.1. Introduction

The Royal Society ('the Society'), as the national academy for science in the UK, has the purpose to recognise, promote and support excellence in science and encourage its development and use for the benefit of humanity. A major activity of the Society is identifying and supporting the work of outstanding scientists through grant schemes and programmes. The Society's grant portfolio supports researchers through its early- and senior-career research fellowship schemes, innovation and industry schemes, research grants, and other schemes.

At the core of the Society's grant programmes are its UK-based early-career fellowship schemes:

- University Research Fellowship (URF) – one of the UK's pre-eminent early-career fellowships, which for over 40 years has provided long-term support to talented early-career scientists to help them transition to an independent research leadership career;
- Dorothy Hodgkin Fellowship (DHF) – aimed to enable outstanding scientists requiring a flexible work pattern to take their first steps into an independent research career. While the offer, duration and objectives are currently similar to those of the URF, for much of the scheme's lifetime it offered a shorter period of funding than the URF, and eligibility criteria required somewhat less postdoctoral experience; and
- Sir Henry Dale Fellowship (SHDF) – awarded in partnership by the Society and Wellcome Trust between 2012 and 2021, these awards were similar to a URF but specifically to support the progression to independent leadership of early-career researchers working on important topics in biomedical fields or public health.

Together these account for over half of the Society's grant expenditure. The Society has been delivering early-career fellowship programmes for over 40 years, with the first URFs awarded in 1983, the first DHFs in 1995 and SHDFs awarded between 2012 and 2021. There are over 500 active early-career research fellows currently supported through these three programmes, and now believed to be around 1500 'alumni' of the schemes (i.e. those who have completed such an award). The main source of funding for the schemes is a government grant, from the Department for Science, Innovation and Technology, with a small number of grants funded through philanthropy and partnerships.

More broadly, the number of early-career researchers in higher education (HE) has increased considerably over the last 20 years, both in the UK and worldwide. The majority of these researchers aspire to an academic career but there are insufficient opportunities for them all to succeed in that aspiration. The transition from a position as a postdoctoral researcher employed on a research grant to becoming an independent research leader with an established academic position is arguably the most difficult step. The Society's early-career fellowships are positioned to support that transition. Within the landscape of UK research funding, several funders (including other UK academies, Research Councils, UK Research & Innovation itself, and certain charitable organisations) offer similar schemes, albeit all differing

slightly in scope, positioning and ambition. The Society's early-career schemes are prominent within this range and the URF, in particular, is especially highly regarded given the long establishment of this scheme.

Meanwhile, the way research itself is being conducted is changing. Increasing attention is being paid to research integrity (including reproducibility, responsible innovation, collaboration, inter-disciplinarity and multi-disciplinarity) and how it is communicated (to maximise impact, maintain transparency and openness, and to engage more with the public and society), which together can be considered broadly as research culture. Equally, there is more concern that research positively supports career paths and skill development, and embraces team science, which relates to the environment in which research is conducted (including concerns for researchers as people). The latter intersects with heightened concerns about equity, diversity and inclusion, through which research funders and employers are doing more to ensure that a wider range of talented researchers can access opportunities and participate equitably.

2.2. Background and the 2018 study

The Society initiated the Career Pathway Tracker project in 2017 as an attempt systematically to monitor the career pathways, experiences and contributions of those it has funded as early-career researchers across the natural sciences, through a longitudinal study. The first career pathway tracker study was completed by CRAC in 2018.[2] This comprised a report derived from a survey which targeted all alumni who had completed a URF or DHF award by 2017, an updated dataset of current contacts, consents for participation in future tracking exercises, and recommendations on how longitudinal tracking could be implemented in future. Amongst those recommendations were the idea that career-focused tracking surveys should be administered roughly every five years, to bring alumni who had emerged in those five years into the study and update information about existing participants.

The longer-term objectives of the Career Pathway Tracker project were to:

- Determine the long-term impact of the Society's early-career research fellowships on the awardees' careers and their scientific research;
- Identify more broadly the contributions these research fellows made (or are making) to the wider scientific landscape, such as through international appointments, leadership roles, influencing science policy and commercial/innovation success;
- Understand the career choices and pathways of the researchers the Society funded through these schemes ('alumni') and factors and trends influencing careers across the natural sciences;
- Provide evidence to improve the provision of support and opportunities that are offered to awardees within these Royal Society schemes;
- Inform broader policy work that seeks to improve research careers and influence systems to bring about changes in research culture and environment;
- Identify current challenges and opportunities facing researchers and those in different groups (e.g., different disciplines, or in under-represented groups).

[2] The project took place in 2017-2018 but report was published in 2018, hence referred to as the 2018 study: https://royalsociety.org/-/media/grants/career-pathway-tracker/crac-data-report.pdf

While not addressing every one of these objectives, findings within the 2018 report provided substantial information about the career pathways and progression of URF and DHF scheme alumni and about their contributions to science, as well as evaluative insights into the extent to which the schemes were achieving their aims and intended impacts. In parallel, the Society published a set of illustrative case studies of alumni and awardees, to celebrate the 35th anniversary of the launch of the URF scheme.[3]

2.3. Scope and aims of this study

It was agreed that the Career Pathway Tracker should from 2023/24 incorporate the current Royal Society early-career fellowship schemes (URF and DHF) and also SHDFs awarded in partnership with Wellcome between 2012 and 2021 – for which CRAC undertook an early evaluation in 2019.[4] While this would be an opportunity to investigate the onward career trajectories and experiences of URF and DHF awardees five years on from what was recorded in the 2018 Career Pathway Tracker study, a key aim was to identify the progress, achievements and experiences of alumni emerging since the first study was carried out (who were not in the scope of that study). Practically, this meant that all SHDF alumni would be covered for the first time as they were not in the scope of the 2018 study. A focus on these more recent alumni should offer the potential to evaluate whether the schemes have continued to deliver the early-career progression and achievement impacts desired, and to identify appropriate individuals for illustrative case studies.

At the same time as gaining updates to information about those already in the Career Pathway Tracker from the 2018 study, the opportunity was taken to refine a few of the questions posed at that time, to obtain more valuable insights into certain issues and achievements. Topics of particular current interest (in 2023/24) were agreed to include:

- Location – international mobility before or subsequent to award, including the extent to which awardees have remained in the UK but also engaged in international collaborations;
- Talent – identifying the impact of these researchers on training the next generation of researchers and leading research groups;
- Economic achievements – more understanding of impacts beyond scientific achievements, including intersectoral experiences, especially in relation to emerging technologies and/or Sustainable Development Goals;
- Renewing the consents necessary to continue the Career Pathway Tracker in future years, but also understanding how best to address and engage alumni progressing into retirement.

2.4. 2023/24 surveys and participation

The implementation of the first Career Pathway Tracker survey, referred to here as the '2018 study' or CPT1, was fundamentally successful in achieving a high response rate amongst the URF and DHF alumni then in scope and positively engaging the 897 alumni who had responded. It was therefore logical to adopt a similar approach for 'new' alumni completing

[3] https://royalsociety.org/-/media/grants/career-pathway-tracker/royal-society-commentary.pdf

[4] 'Evaluation of the Sir Henry Dale Fellowship Scheme', CRAC report for Wellcome and the Royal Society, 2019, unpublished

awards since 2017 who would be targeted for engagement for the first time, with an updated survey instrument containing a few refinements to seek new or better data about the topics of interest listed above (but retaining as many of the same questions as possible for consistency and potential comparability of data). Thus, a 'new alumni' survey was devised and targeted to the 193 new alumni in scope and for whom an operable current email contact was held by the Society and/or obtained by our pre-survey contact checking process. However, the opportunity was also taken to direct invitations to this survey to alumni who were in scope and targeted by the first Career Pathway Tracker but who had not responded in 2018 – this was a further 280 alumni (again, including some for whom we obtained new email contact data). This survey was deployed using access control, in order to monitor participation and issue targeted reminders, by our partner the Institute for Employment Studies (IES). The survey was launched in early November 2023 and remained open until early January 2024.

A principle agreed for the Career Pathway Tracker project was minimisation of response burden for participants. In our recommendations in the 2018 report we proposed that future survey designs should minimise the number of questions that previous respondents should be asked to repeat, i.e. to reduce duplication of response effort. As a result, we designed a separate survey for implementation in 2023/24 with alumni who had responded to the first Career Pathway Tracker (and consented to their data being retained, and to being re-contacted). This 'previous respondents' survey was based on the 2018 survey instrument but incorporating changes and additions included in the 'new alumni' survey. It comprised three types of questions:

- Pre-existing questions from the first Career Pathway Tracker survey (CPT1), for which we would provide the response that the respondent had provided in 2018, which they could review and update if necessary;
- Updated questions – questions which previous respondents would need to answer anew, as the formulation of the question had been updated or it was considered necessary to obtain a new response (such as to obtain consents);
- New questions – a small number of entirely new questions not posed in 2018.

Practically, following extremely careful combination of the pre-existing response data and current contact data (some of which we had seek and update as alumni had moved since 2018), this required IES to 'pipe' existing responses into the new survey questionnaire issued using access control to the 825 appropriate alumni. This number was less than the 897 respondents in the 2018 study due to a proportion then choosing not to consent to engage in further surveys in the Career Pathway Tracker project. The survey was open for responses from mid-November 2023 to mid-January 2024. While a novel survey strategy for us, piping of pre-existing responses proved effective, with some respondents commenting that they appreciated the effort we made to reduce the input needed by them.

In terms of survey response samples achieved, after data cleaning and removal of a handful of responses from respondents who were ineligible (i.e. had been wrongly identified as alumni within scope), 245 responses to the new survey were received from the 473 invitations in scope (52%), comprising 140 newly emerged alumni (from 193 targeted, a 73% response rate) plus 105 of the 280 (38%) who had not responded to the first survey five years previously. For the survey of those who had responded in 2018, 543 responses were obtained (from 825 invitations, or a 66% response rate). These high response rates – approaching what was achieved in the first Career Pathway Tracker – were extremely encouraging, while the receipt

of 105 further responses from those who had not responded to that first survey (over one third who had not responded) was an unexpected bonus and increased the cumulative total sample in the project.

As an indication of representativeness, the confidence interval for a 95% confidence level for the 140 newly emerging alumni (from 193 targeted) was in the range of 2-4% depending on the result, while for the previous respondents, the confidence interval was in the range 1-2% with that 95% confidence level.

2.5. The cumulative data picture, analytical approaches and report focus

All the survey response sub-samples above were combined into a single dataset and recombined with key pre-existing grant system data about each respondent (provided by the Society) and their 2018 survey response where it existed. Consolidation of all the data in this way allowed for consideration of the best approaches to analyse the data. Results for each survey separately were not helpful given the way the two surveys covered different combinations of various sub-populations of alumni.

The overall Career Pathway Tracker data landscape is shown in Table 2.1. For brevity, the first and second Career Pathway Tracker studies are referred to as CPT1 and CPT2 (and here onwards). This shows that 1142 alumni have responded at some point so far, from 1370 that have been invited to do so, while an estimated 300 other awardees – mostly from the early period of the URF scheme – could not be invited because of a lack of useable email contact data (despite search efforts undertaken in 2018 to find these awardees). In CPT1, 897 eligible responses were drawn (from just under 1100 invited), of which 825 alumni consented to continue engagement. In the CPT2 surveys, 543 of these 825 responded and 282 did not, together with a further 105 of the pre-existing alumni and 140 alumni emerging since the 2018 CPT1 study. Thus, the data available for analysis comprised 788 new or updated responses, while CPT1 data only continued to be available for a further 282 alumni.

Table 2.1 Cumulative Career Pathway Tracker data landscape

Project survey wave	**Alumni cohort**	**Responses / invited**	**Responses / invited**	**Other population**
CPT2 ‘new’ [alumni] survey	Since 2017	140 / 193		
	Prior to 2017	105 / 280		
CPT2 ‘previous respondents’ survey and CPT 1 survey	Prior to 2017	543 / 825*		
CPT1 survey only	Prior to 2017		282 / 825*	
No response to either survey				53 (CPT2) + 175 (CPT1) = 228
Unreachable				c.300 (est.)

*Total reduced to 825 (from 897 in CPT1) due to respondents choosing not to take part in further waves

However, in practice these accumulated data cover alumni from the three different fellowship schemes, which have existed during different periods: URF since 1983, DHF since 1995 and SHDF only since 2012 (although this project considers alumni, so it is completion dates of

awards that are most critical, not scheme launch dates). Table 2.2 shows the composition of the data obtained in CPT2 surveys in relation to the three schemes and periods of award completion. The segmentation builds upon that used in the CPT1 project (and the 2018 report), for ease of comparison between results in that report and this one. Where respondents undertook more than one of these fellowship types, their response was requested for the most recent fellowship (and completion date recorded on that basis). The combined total here (751) reflects that a proportion of respondents did not recall or state the year in which they completed their award.

*Table 2.2 CPT2 survey responses, by scheme and award completion period (*N=*751)*

Scheme **Alumni cohort**	**URF**	**DHF**	**SHDF**
2018 onwards	98	19	33
2008-2017	195	49	-
1998-2007	211	32	-
Prior to 1998	114	-	-
Total	*618*	*100*	*33*

As the data covered three schemes operating over different periods – and the three schemes differed in terms of eligibility, duration, package and desired impact – we chose to approach data analysis primarily by scheme, and then within a scheme by completion period. While this inevitably reduced the size of the response sub-samples being analysed, we believed it would produce more meaningful results than most that could be derived across the schemes. However, results for particular cohort ranges within any scheme should only be regarded as illustrative rather than statistically representative, because of the small sub-samples. The structure of this report adopts that analytical strategy, i.e. presenting key results by scheme and, where appropriate, results within that scheme for the cohort of alumni who have emerged since the first Career Pathway Tracker study. A number of cumulative or composite results are presented for certain themes, where this was felt appropriate.

An additional factor now emerging for the Career Pathway Tracker project is that a substantive number of alumni have now retired. As that number grows over time, a project strategy in relation to retirees needs to be considered, as many may wish to exit from the tracking system and the value of ongoing responses from them is likely to become purely historic. This is addressed further in a later thematic chapter.

Part B – Early-career research fellowship outcomes and impacts

3. University Research Fellowship

3.1. The URF scheme

It is now over 40 years since the first URF awards were made and the scheme remains one of the UK's pre-eminent early-career fellowships. The scheme is positioned specifically to provide long-term support to talented early-career scientists with the potential to become research leaders to:

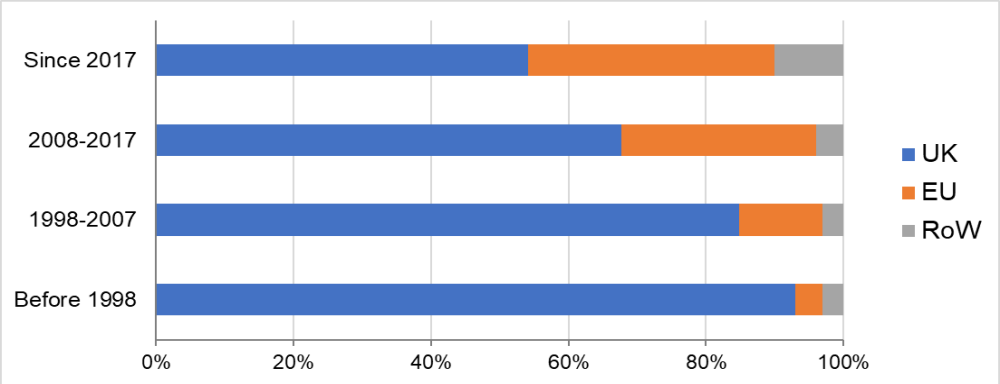
- Build an independent research career at a UK university or research institution;
- Have freedom and time through flexible long-term support to pursue innovative research;
- Develop their research leadership skills through a support package of high-quality professional development, networking and engagement opportunities.

The URF initially provided up to 10 years of support and funding but are now of eight years duration (years six to eight contingent on a mid-fellowship review). To be eligible for a URF, scientists need to have three to eight years of postdoctoral research experience but not hold a permanent university/institution post. In 2022/23 the Society awarded 54 URFs, while the maximum funding value for a URF is £1.8 million (in the 2024 application round).

Our 2018 report (on the CPT1 survey) presented a variety of statistics on the profile of URF awardees, including that around one in four were female. It is worth noting that survey response data from alumni gives a retrospective view of participation, as the most recent alumni obtained their award at least eight years ago. However, amongst CPT2 survey respondents completing a URF since 2017, the proportion of women had risen to 35%. This may reflect a slight over-representation of female respondents in the survey responses, as grant system data suggest that 30% of awardees starting in the relevant period were female.

While four out of five of all URF respondents in the survey were UK nationals (80% UK, 16% from an EU country and 4% from the rest of the world), there has been substantial change in the nationality profile of URFs over time. While 93% of respondents completing their URF before 1998 were UK nationals, this proportion has fallen progressively and was 59% amongst those completing since 2017 (at which time 30% were from an EU country and 11% from the rest of the world). Figure 3.1 demonstrates this shift with time.

Figure 3.1 Nationality of URF awardees by grouped year of award completion (CPT2 alumni survey responses: N=*582)*



On the basis of survey respondent results, URFs in the period studied have been undertaken very largely on a full-time basis but there is some evidence that this has begun to change slightly. Under 1% of respondents completing a URF by 1998 reported that they had worked on it part-time during their award, while this was 3% for completions in the period 1998-2007, and just over 4% for completions since then. Grant system data suggest that just over 4% of current URF awardees are undertaking their fellowship on a part-time basis.

Another insight into profile that became available through the latest survey is the period between doctorate and start of the URF award (i.e. prior postdoctoral experience), although this could have included any career breaks. Analysis of these data – based on alumni respondent recollections of year of doctorate and year of award start – shows that such periods have varied from nil to 12 years but revealed that the mean period has been increasing. Across the entire scheme the mean period has been just over four years, but this has increased from 3.1 years for those completing prior to 1998 to 5.9 years for the most recent cohort of alumni (Table 3.2).

*Table 3.2 Mean length of postdoctoral experience prior to start of award, by year of award completion, as stated by URF alumni survey respondents (*N=*625)*

	Overall	**<1998**	**1998-2007**	**2008-2017**	**Since 2017**
Mean (years)	4.3	3.1	4.0	4.5	5.9

3.2. Current employment positions

As the Career Pathway Tracker project is longitudinal and given the longevity of the URF scheme, it was no surprise that almost 50 URF alumni who responded to the current survey had moved into retirement (7%). The survey did not pose further questions to these respondents about their current circumstances. Once these respondents were excluded, 98% of the remainder reported that they were employed and 2% self-employed (suggesting that all but one of those of working age who were engaged by the survey were still working). In total, 93% of those working stated that they were currently research-active.

3.2.1. Sector and employer

Similarly to the 2018 survey result, 94% of all working URF respondents were employed or working in academia/HE or a public research institute. The other sectors in which the other 28 respondents worked were principally STEM-related; eight in pharmaceuticals/life sciences, seven in engineering or energy, six in digital, with under five in each of publishing, the public sector and the third sector (and one respondent in each of a few other non-STEM sectors). However, it is highly likely that this result under-represents the true proportion of all URF alumni who work outside academia/HE, because we believe a disproportionately high proportion of alumni that the Career Pathway Tracker is unable to engage are working in other sectors (where they are far less traceable).

Amongst recent URF alumni (i.e. those completing an award since 2017, for whom contacts data was complete and all were targeted by the survey), 96% were working in academia/HE, and all the remainder were working in a STEM-focused sector (one in energy, one in pharmaceuticals, two in digital and one a European research organisation). Within the most

recent cohort of URF alumni in the 2018 study, 98% had been working in academia/HE, for comparison.

Overall, it is worth noting that amongst all URF alumni in the CPT2 survey, 96% said they were currently research-active, including all of the recent alumni (since 2017). Of the 26 respondents who said they were not research-active, two thirds were employed in academia in non-research roles and the remaining third in non-research roles in other industries. Amongst all URF alumni working in sectors other than academia, over half stated they were still research-active.

Amongst URF alumni respondents for whom the institution at which their award was held was also known, almost exactly half (265 out of 520 alumni) were at the same institution at the point of survey.

When the location of current employment was analysed, 87% of the alumni were working in the UK. Amongst these, analysis of employer locations was most straightforward for those currently working in academia/HE (*N*=436), revealing that 82% were working in Russell Group member institutions, 15% in other types of UK university and 4% in specialist institutions. Geographically, there were URF alumni currently working in universities in all four UK nations and every English region (Figure 3.2), with 85% in England including 18% in London and 18% in the South East (and a further 15% in the East of England, so almost half in these three regions). This distribution profile was very similar to that of the locations in which the awards had been held, with apparently only very slight migration ‘outwards’ from London, the South East and East (where 52% of awards had been hosted).

Figure 3.2 Locations of current employment of URF alumni working in academia/HE in the UK (N=436)

3.2.2. Employment level

With the vast majority of recent alumni employed in academia/HE, it was possible to apply the UCEA/HESA job level categorisation[5] to the job titles that working respondents to the survey provided, as used in the 2018 study. As many depictions of alumni employment levels are included in this report using this categorisation, Table 3.3 is a reminder of the relevant levels, with descriptions and example roles, plus an abbreviated descriptor used in the charts that follow to assist interpretation.

Table 3.3 UCEA/HESA academic staff level categorisation

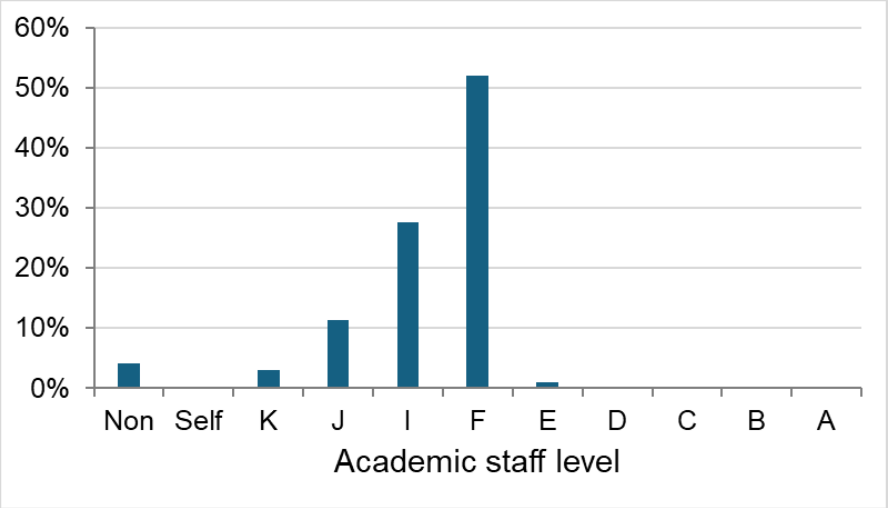
Level	**Description**	**Example job title or descriptor**	**Abbreviated descriptor in charts**
A	Head of institution	Vice-Chancellor	Vice Chancellor
B	Highest level of manager reporting to Head of institution	Deputy/Pro Vice-Chancellor	Pro Vice Chancellor
C	Head/Director of major academic area; Director of function/s	Executive Dean; Dean, Head of College; Finance Director; Director of Research	Executive Dean
D	Head of an academic centre	Head of Department; Associate Dean; Director	Department Head
E	Head of small centre; senior function head	Director; Division Leader; Head of Human Resources	Division Leader
F	Professor; function head	Professor; Functional Manager	Professor
I	Senior academic lead	Associate Professor; Reader; Principal Lecturer; Principal Research Fellow	Reader
J	Senior academic staff	Assistant Professor; Senior Lecturer; Senior Research Fellow; Royal Society Research Fellow	Senior Lecturer
K	Academic staff	Subject Lecturer; Postdoctoral Research Fellow; Research Fellow; Research Associate	Research Fellow
L	Academic staff	Lecturer; Researcher; Postdoctoral Research Fellow/Associate/Assistant; Research Officer	Postdoc

On this basis, the levels of current employment of URF alumni completing awards since 2017 within the CPT2 survey are illustrated in Figure 3.3. This shows that the most common job level was that of Professor (Level F), which was the case for 52% (and 54% of those in

[5] See Appendix 2 of this report. Universities and Colleges Employers Association, Higher Education Statistics Agency: https://www.hesa.ac.uk/collection/c23025/combined_levels

academic positions). For reference, a named Research Fellowship (such as the URF) is classified as Level J.

*Figure 3.3 Level of current employment position of URF alumni respondents who completed awards since 2017 (*N=*98)*

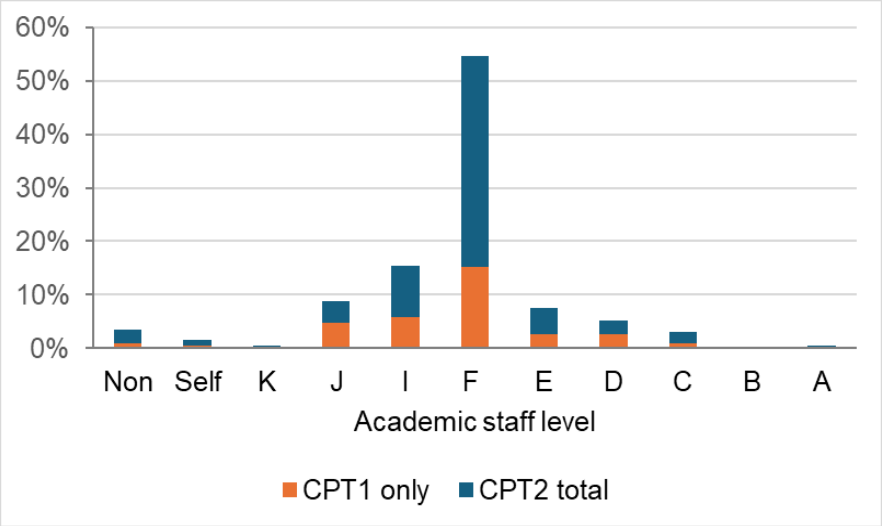


Non	Non-academic occupation
Self	Self-employed
L	Postdoc
K	Research Fellow
J	Senior Lecturer
I	Reader
F	Professor
E	Division leader
D	Department Head
C	Executive Dean
B	Pro Vice-Chancellor
A	Vice-Chancellor

A similar analysis was developed for the current employment job levels for all working URF alumni who responded to the CPT2 survey. This revealed that in total 58% of respondents in the recent survey had a Professor-level post (which was 62% of those in academic posts) and 75% had a position at either that or a more senior level (which was 79% of those in academic posts). These results were then combined with those for 2018 survey respondents who have since retired or did not respond to the recent survey (i.e. who did not provide this information in the CPT2 survey). Expressed as percentages of these combined populations, in total at least 71% have reached at least a Professor-level post or 75% of those who pursued an academic career (Figure 3.4).

Further analysis of career progression is included in Section 3.4, where this and other aspects of evidence are considered as potential measures of achievement of certain intended scheme impacts.

*Figure 3.4 Level of current employment position for URF alumni respondents working in academia: all CPT2 survey respondents (*N=*574) and CPT1 survey respondents who are now retired or did not respond to CPT2 survey (*N=*280)*



Non	Non-academic occupation
Self	Self-employed
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K	Research Fellow
J	Senior Lecturer
I	Reader
F	Professor
E	Division leader
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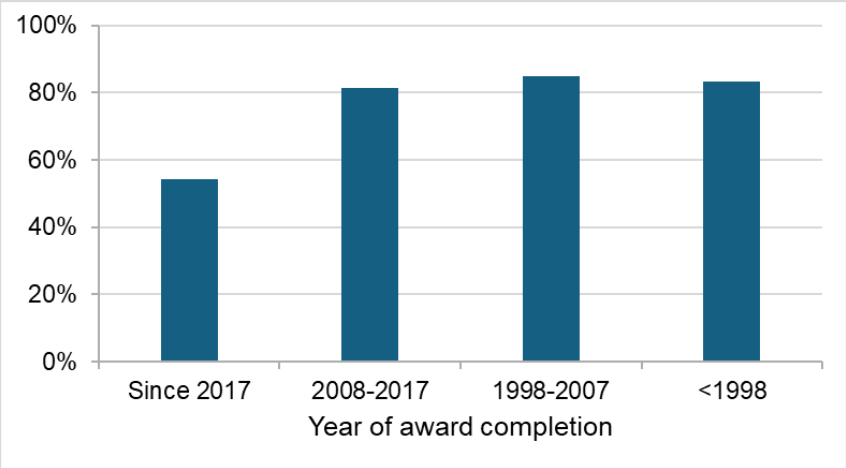
B	Pro Vice-Chancellor
A	Vice-Chancellor

Analysis of the numbers and proportions of URF alumni in different periods of the scheme (based on completion date) who have reached the level of Professor or higher showed a relatively clear trend with time, i.e. a rising proportion gaining such a level of employment with time since their award completion date (Figure 3.5). The slightly lower proportion amongst the earliest alumni could reflect that the total population of professors was lower at that time.

*Figure 3.5 Proportion of URF alumni respondents with a current position at the level of Professor or higher, with period of award completion: CPT2 survey respondents (*N=*542)*



3.3. Country of employment and retention

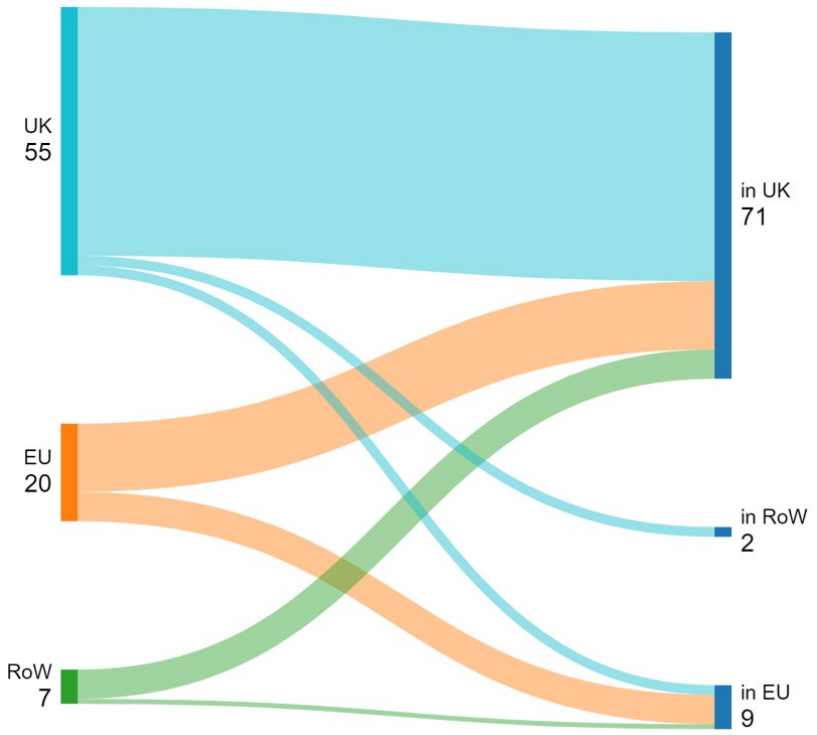
Insights into international mobility of alumni are given in a later chapter but here we can report that 80% of working URF alumni who responded to the survey were currently in the UK, 9% in an EU country and 11% in another country (Table 3.4). Amongst UK nationals, the proportion working in the UK was higher (85%) than amongst those of other nationalities (57%).

Focusing on URF alumni who completed an award since 2017, 87% of all alumni were working in the UK, with 11% in the EU and 2% outside the EU. Almost three quarters (74%) of those with a non-UK nationality were still in the UK at this point, in addition to the 93% of UK nationality, suggesting significant retention of scientists with URF awards at least five years post-completion. Analysis of the 13% of recent URF alumni working outside the UK revealed that all but four were non-UK nationals, presumably reflecting that most of them had returned to their home nation (or a third country) soon after their award. A Sankey diagram (Figure 3.6) for alumni since 2017 whose location and nationality are known, breaking these down further to UK, EU nations and nations outside the EU, graphically illustrates the retention effect.

Table 3.4 Location of URF alumni respondents who were currently working, by nationality and grouped year of completion of award[6]

	All URFs			Since 2017			2008-2017			Before 2008		
Nationality	All	UK	Non-UK	All	UK	Non-UK	All	UK	Non-UK	All	UK	Non-UK
Location												
UK	80%	85%	57%	87%	93%	74%	80%	89%	62%	77%	82%	33%
EU	9%	4%	27%	11%	4%	26%	9%	2%	25%	9%	5%	33%
RoW	11%	11%	16%	2%	4%	0%	12%	9%	13%	15%	13%	33%
N	*578*	*432*	*111*	*100*	*55*	*27*	*195*	*129*	*55*	*285*	*247*	*30*

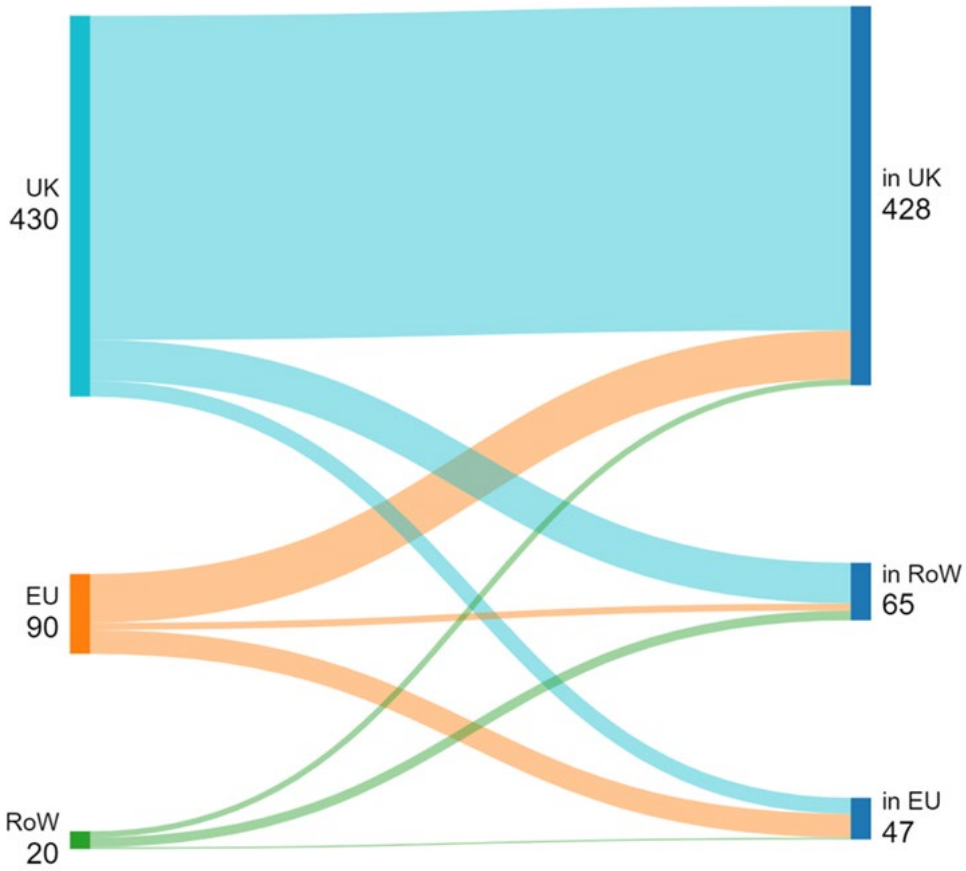
Figure 3.6 Sankey diagram showing nationality of URF alumni since 2017 (left-hand axis) and current location of employment (right-hand axis), where both nationality and location known



[6] Note that the columns headed 'All' contain some respondents who did not report their nationality

Table 3.4 also shows that the proportion of working alumni who had completed awards in earlier periods of the scheme displayed higher proportions working abroad over time. Amongst alumni who had completed prior to 2008, for example, just over 80% of UK nationals remained in the UK (i.e. one in five of these had migrated overseas, compared with around one in twelve within five years of completion), but the location of those of non-UK nationality were evenly split between the UK, EU and RoW, i.e. the majority of non-UK nationals were no longer in the UK. When the nationalities and current locations for URF alumni throughout the lifetime of the scheme are considered numerically, as a Sankey diagram (Figure 3.7), the cumulative picture is one of balance. The total number of URFs still working in the UK (428) was almost identical to the total number of UK nationals (430), suggesting that the retention effect of the URF has just about dissipated. This is a result of the longevity of the scheme (over 40 years) and a high proportion of earlier alumni remaining in the sample, of whom a progressively higher proportion of non-UK nationals eventually leaves the UK, together with a small proportion of UK nationals in the longer term (generally over 15 years post-completion of award). Nonetheless, this should not detract from the finding that the scheme has been providing a retention effect for a substantive part of alumni's careers (20-25 years including the award period), i.e. retaining them in the UK during what is likely to have been a particularly crucial and productive period of their career.

Figure 3.7 Sankey diagram showing nationality of all URF alumni respondents (left-hand axis) and current location of employment (right-hand axis), where both nationality and location known

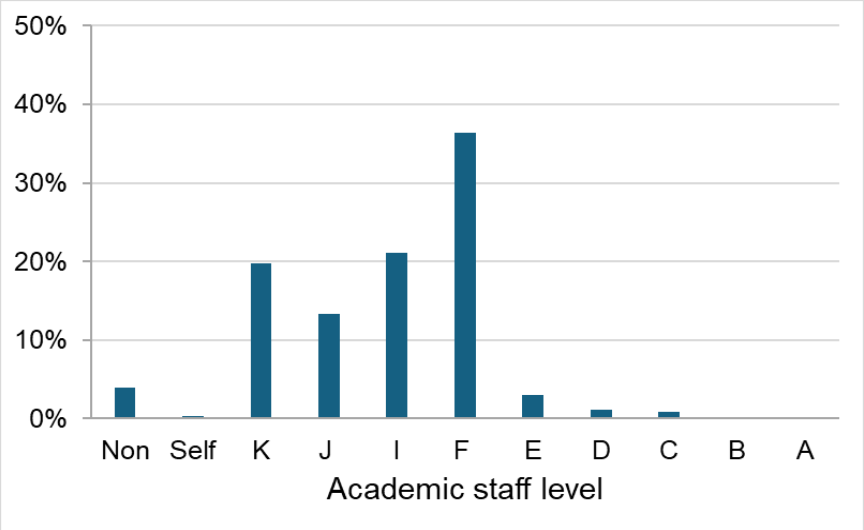


3.4. Achievement/impact metrics

3.4.1. First positions after award

One of the aims of the URF scheme is for awardees to achieve a position of independent research leadership, for which a number of proxies in the survey data are available. While a cumulative view of this was presented in the previous section, suggesting that three quarters of all URF alumni have achieved such a position at Professor level, or more senior, another insight into this is to understand the nature of the first position they took up following completion of their award.

*Figure 3.8 Level of first position following completion of URF award (*N=*568)*



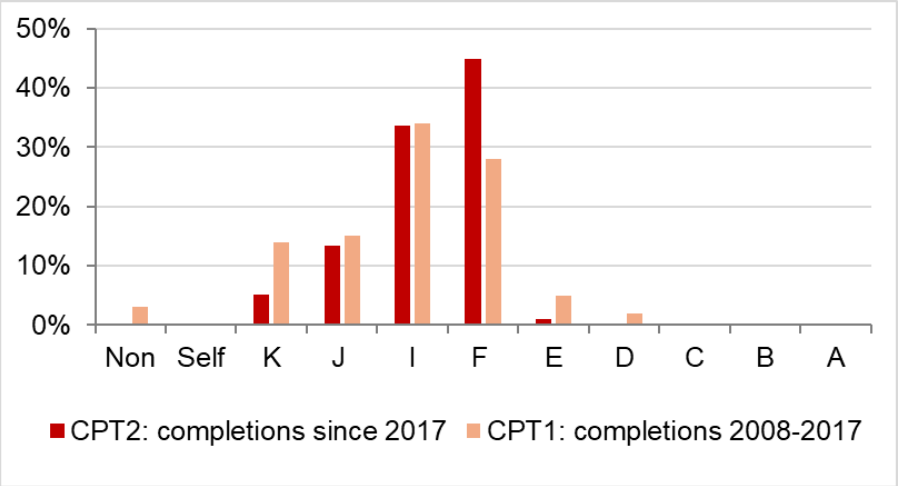
Non	Non-academic occupation
Self	Self-employed
L	Postdoc
K	Research Fellow
J	Senior Lecturer
I	Reader
F	Professor
E	Division leader
D	Department Head
C	Executive Dean
B	Pro Vice-Chancellor
A	Vice-Chancellor

Overall, for all URF alumni in the CPT2 survey, just over 41% had obtained a Professor- or higher level position as their first job following their award (and 43% of those in academic positions), and Professor level was the most commonly achieved level of first position (by over 36% of URF alumni, and 38% of those on an academic trajectory at that time). The profile of levels of the first jobs is shown in Figure 3.8. This is a very similar profile to that observed in the CPT1 survey in 2018, albeit with a higher proportion overall now stating that they had achieved a Professor-level post immediately after award than was the case five years ago.

This analysis was also undertaken purely for URF alumni completing awards since 2017, i.e. the most recent grouping, and results compared with those obtained for the most recent cohort in the CPT1 study (Figure 3.9). This confirmed that a higher proportion of recent URF alumni obtained a Professor-level post immediately after their award (45%) than was the case for recent alumni in the 2018 study (34%). If we consider achievement of a Professor-level post as a key performance measure for the scheme, then this suggests that nearly half of the most recent URF alumni have achieved this immediately after completion of their award, which is higher than was the case for those participating earlier in the lifetime of the URF scheme.

This reflects that a greater proportion of more recent alumni have achieved such a post, compared with alumni early in the scheme; it is also known that the total number of Professor posts in UK academia has risen significantly during this time, as context.

Figure 3.9 Level of first position following completion of URF award, for recent alumni (CPT2, alumni completing awards since 2017: N=*98; CPT1, alumni completions 2008-2017:* N=*295)*



Non	Non-academic occupation
Self	Self-employed
L	Postdoc
K	Research Fellow
J	Senior Lecturer
I	Reader
F	Professor
E	Division leader
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C	Executive Dean
B	Pro Vice-Chancellor
A	Vice-Chancellor

3.4.2. Obtaining a permanent position

Another aspect of establishing independent research leadership is achieving sustained employment, which in the context of this early-career scheme can be regarded as obtaining a permanent contract of employment. URF alumni respondents working in academia were invited to state the year in which they first achieved an open-ended (permanent or tenured) position. This suggested that 87% of all URF alumni achieved such a position the year of completion of their award (and half of these before the end of the award) and all but two achieved one eventually. The analysis was not applied to those in other sectors as open-ended contracts tend to be very widespread even at junior levels.

Amongst recent URF alumni working in academia, all but a handful had obtained a permanent position by the time they completed their award or in that same year (94%) and at the time of survey only one did not. This is a higher proportion than was recorded in the CPT1 survey for the most comparable segment of URF alumni (78%) and it is conceivable that this reflects some positive respondent bias (despite the high rate of response).

3.4.3. Research-related metrics

When reporting on the first CPT survey, we stated that 96% of URF alumni at that time had published a significant paper as a principal investigator by the year they completed their award.[7] In the current survey (CPT2), the corresponding proportion for all URF alumni respondents was the same (96%), while 99% had ultimately published such a paper at some point. Similar results were seen specifically amongst URF alumni who completed awards since 2017 (96% by year of completion, and 97% to date).

Amongst other measures, 87% of recent URF alumni (completing awards since 2017) had been successful in winning a significant research grant as a principal investigator by the end of their award, or in that year, and 91% have done so to date. Overall, 80% of all URF alumni

[7] The term Principal Investigator was not defined in the survey questionnaire so it is possible this could have been interpreted differently by some respondents, such as in certain disciplines

in the survey successfully managed to do this by the end of award completion (and 96% by the time of survey).

97% of the URF alumni completing awards since 2017 had recruited at least one researcher into their research group by the time they completed their award (and all bar one individual had done so at the time of survey). This was markedly higher than the 88% of all URF alumni in the CPT2 surveys who had done so by completion of award, although in all 98% of all URF alumni in academia have done so at some point to date. When surveyed, three quarters of the currently research-active URF alumni had at least one postdoctoral research staff member in their group (and a mean of just under three such staff), while half had researchers at other career stages. 38% of them had at least one technician or professional services staff member in their group. Amongst the most recent URF alumni, a similar proportion (76%) had at least one postdoc in their group, 37% had other levels of researcher and 28% a technician/professional services staff member in their group.

Similarly, 98% of recent URF alumni had supervised a doctoral student to successful completion by the time they completed their award, again much higher than the 80% recorded for all URF alumni by the time they completed their award, although 99% of the latter reported that they had done so by the time of the survey. At this point, 91% of the research-active URF alumni (and 90% of recent alumni) had at least one doctoral researcher in the group they led, with a mean of 4 doctoral researchers each (and a few having 30 or more).

Summarised in tabular form (Table 3.5), collectively these results show the high extent to which these potential measures of establishment of independent research leadership have been achieved by URF awardees, with evidence that higher proportions of the most recent cohort of URF alumni have achieved them more quickly than their earlier counterparts. More insights into the leadership role that alumni have played, and continue to play, are considered in the next section and also in a later thematic chapter.

Table 3.5 Proportions of URF alumni survey respondents achieving measures of establishment of independent research leadership (all URF alumni respondents: N=*627; alumni completing since 2017:* N=*98)*

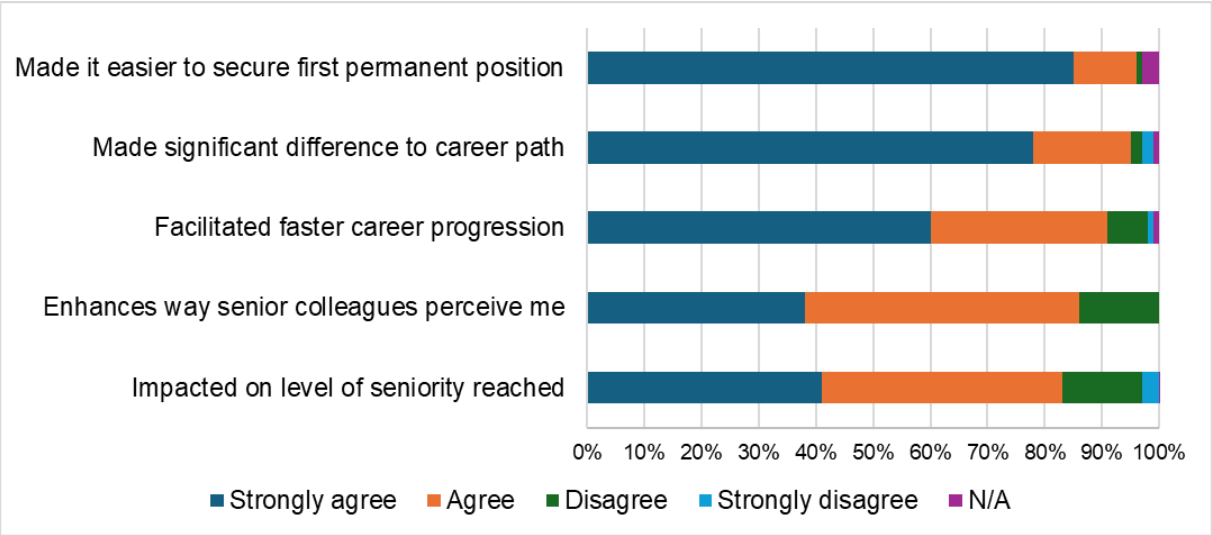
	All URF alumni		**URF alumni since 2017**	
	By year of completion	To date	By year of completion	To date
Obtained permanent position	87%	>99%	94%	99%
Obtained professor-level post	55%	75%	74%	78%
Won significant research grant	80%	96%	87%	91%
Published significant paper	96%	99%	96%	97%
Recruited research staff	88%	98%	97%	99%
Supervised doctoral student to completion	80%	98%	98%	99%

3.5. Perceptions of impact and reflections on the award

Here we focus particularly on responses from the most recent URF alumni in the current survey, in order to assess whether the generally very positive perceptions of the benefits and impacts of the URF award recorded in the previous report (for all alumni at that time) continue amongst the alumni completing awards since 2017. Figure 3.10 illustrates strong positive

perceptions of the impact of the award on their careers, with 95% suggesting that the award made it easier for them to secure permanent employment and for over 90% a significant difference to their career path and faster progression.

Figure 3.10 Extent of agreement with statements about the impact of research fellowship on respondents' career (URF alumni respondents completing awards since 2017: N=*98)*



The extent of impact in relation to career level reached to date and how senior colleagues view alumni were somewhat less strongly perceived, but still with over 80% of respondents agreeing that these were positive effects. In all cases these are slightly stronger results than seen in the first Career Pathway Tracker report, albeit the results presented in that report were for all URF alumni and not only the most recent cohort at that time.

Figure 3.11 URF alumni respondents' perceptions of the value of their fellowship on a range of aspects of development of research leadership (URF completing award since 2017: N=*98)*

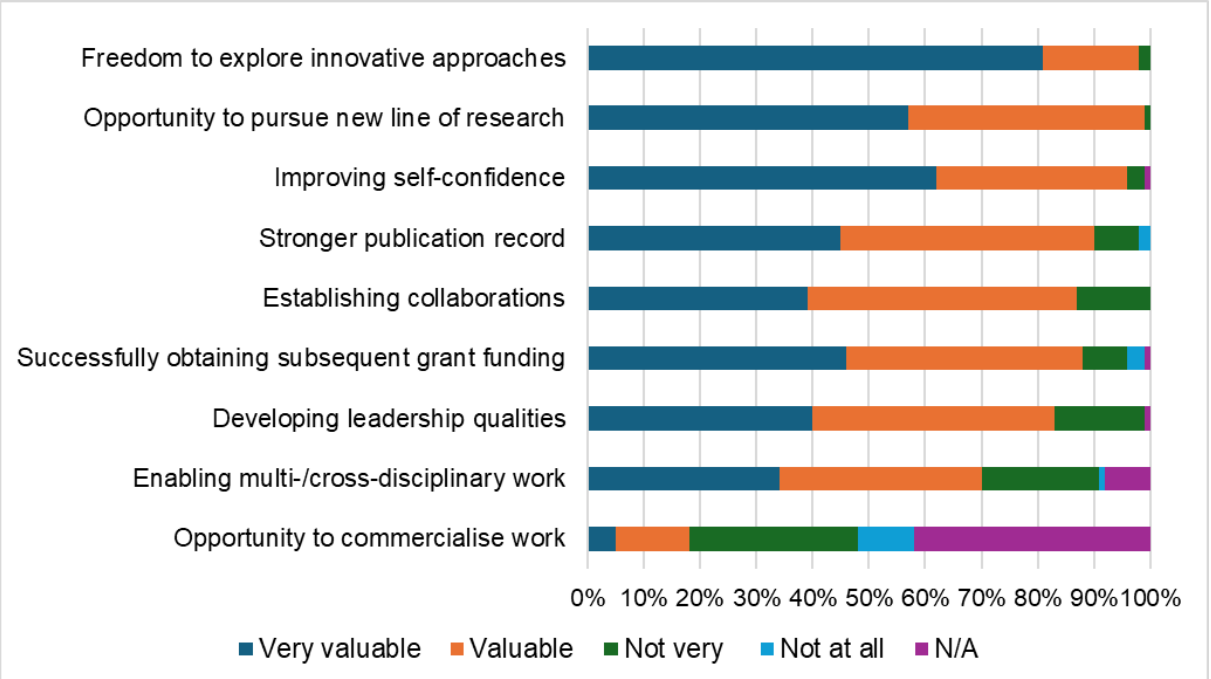


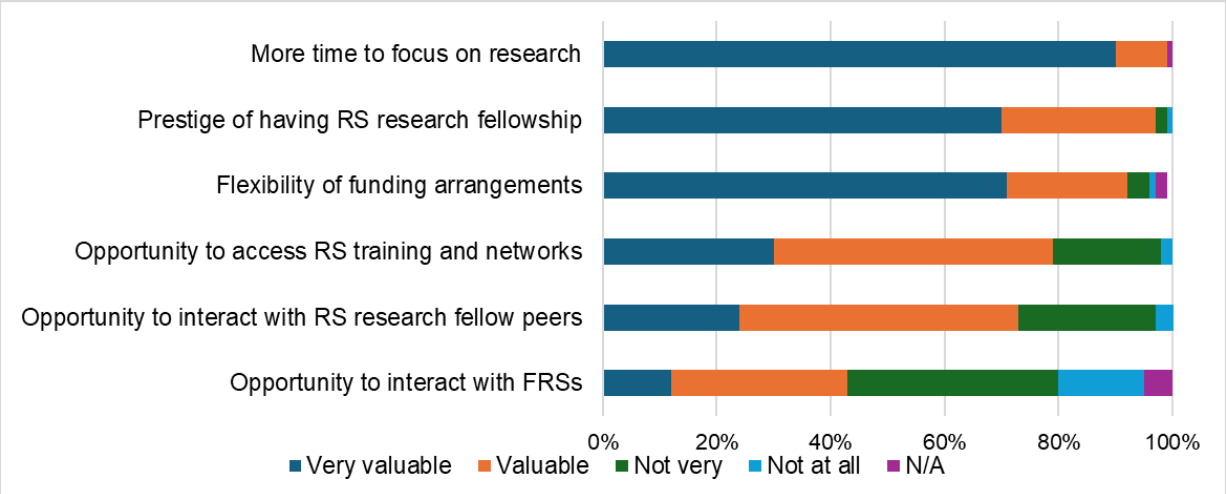
Figure 3.11 illustrates perceptions from URF alumni completing awards since 2017 that reveal mostly very positive attitudes about the value of the award on particular aspects of the development of research leadership. Again, these are extremely similar to the results obtained for URF alumni in the CPT1 survey, and in a few cases stronger perceptions of value (in relation to developing leadership qualities and enabling inter-disciplinary work) than were observed for all URF alumni in that previous study. Not only does the value of the award in terms of the freedom to explore new research approaches and new lines of research stand out, but also its impact in terms of improving the self-confidence of the awardee – more than 95% seeing its value for these aspects.

Other comments made in relation to the value of the award were value of having a peer group of people at a similar career stage and the networking opportunities, as well as the continuity (to focus on research) that it enabled whilst an awardee was raising a family.

> *"The networking was extremely important and helped me establish connections to a number of amazing scientists and role models associated to the Royal Society".*

When asked in more detail about the extent of value of different potential benefits of the award, towards development of research leadership, URF alumni since 2017 almost universally rated of high value the additional time it availed to focus on research and the prestige of having the award (Figure 3.12). A very high proportion also rated highly the value of the flexibility of the funding, while the majority saw some or great value in the peer network of awardees and the training and development support offered. A smaller proportion (but still nearly half) appreciated opportunities to interact with Fellows of the Royal Society that the award brought. These results, again, are as or even more positive than those reported for all URF alumni in the first Career Pathway Tracker report.

Figure 3.12 URF alumni respondents' perceptions of value of different potential benefits of fellowship in development of research leadership (URF completing awards since 2017: N=*98)*



Comparison of these results from URF alumni completing awards since 2017 with those from all URF alumni responding to the CPT2 survey suggested that recent alumni rated all of these potential benefits as at least slightly more valuable than did URF alumni overall. There were somewhat larger differences for the perceived value of the prestige, access to training and networks and interacting with their peers, which presumably reflect the potentially greater value

of these benefits to those early in their career (compared with all alumni, who were at a wide variety of career stages).

Respondents were also invited to summarise the difference that they felt the URF had made to their career. Focusing on responses from the most recent cohorts of URF alumni (completing awards since 2017), their responses strongly reinforce the results shown earlier in this section and provide compelling views of research and career impact. Thematic analysis of these c.90 comments revealed that the following topics were most commonly cited:

- The opportunity (freedom) to pursue personal research interests, which many also identified as more fundamental, innovative or 'risky' research than would have been possible with other funding;
- The long duration of the URF, enabling an extended period of independent research freedom, which underpinned the pursuit of ambitious research goals;
- The stability afforded by duration and flexibility of award – offering choice of location which could enable movement to a key research group or equally satisfy personal goals such as dual careers and/or development of a family;
- The freedom from other commitments in academic work, notably teaching and administration, which enabled much greater focus on research, and/or the option to accept a light teaching load which was ideally focused on their interest;
- The fellowship had enabled them to return to or remain in the UK, and/or remain in academia, which otherwise they would have left for an alternative career direction.

The following responses from URF alumni since 2017 have been selected to illustrate a range of career-related impacts:

> *"Essential to establish an independent research group and build activity to give the foundations for further funding, including obtaining a European Research Council consolidator grant. The freedom to pursue interesting lines of research and establish international collaborations and an international profile was possible thanks to the flexibility of the URF."*
>
> *"It enabled me to start my own research active group in the UK. Simply, if I did not get the fellowship I don't think I would have been likely to return to the UK. This is because I took a longer postdoc than normal and was ineligible for other fellowships. I believe that in the UK I have been able to embrace a far more interdisciplinary line of research than I would have been able to elsewhere."*
>
> *"Without a question the URF gave me a huge career boost. The prestige (and financial value) of the grant was, I think, the main reason that I landed a (proleptic) permanent job very soon after the award; and the opportunity to concentrate exclusively on high-risk, high-gain research projects allowed me to build a much stronger enduring research programme than I would otherwise have had. In short, the URF made my career."*
>
> *"It gave me a chance to pursue a relatively risky and new research direction that was not being pursued by anyone else in the UK at the time. Because of this I have the job I have now. I don't think this would have been possible with any other early career funder. Also, the research funding for consumables and equipment was extremely beneficial to experiments."*

"Everything to my current career. I don't believe that there were relevant opportunities in [subject] in the UK that would have led to a lectureship (mainly research) position at that time. The support from the RS when I had my children and needed to move universities was great. The chance to sit on committees with FRSs and other senior colleagues was invaluable for learning more about how to be a scientist and leader in the broader sense."

"I do not believe that I would be in academia without it. The fellowship allowed me to set my own research agenda and allowed me to take a position in a university that made sense for me both professionally and personally, allowing me to solve the "two-body problem" [dual careers] and settle down with my wife (and now children). I think the geographical freedom of a fellowship is often overlooked."

"The fellowship had three clear benefits. In the early years of fellowship, it gave me the freedom to explore my own ideas and to deliver my own research programme. This has really helped establish me as an expert in my field. Later [it] allowed me to pick up a small amount teaching responsibilities without having to take on a full academic load, allowing me to be much more research active than other academics in my field."

3.6. Other contributions

The majority of URF alumni (responding to the survey) stated that they made contributions to public engagement and knowledge exchange, while just under half did so in relation to policy-making at national level. Analysis of these results by cohort of award completion dates (Table 3.6) showed a number of variations. The balance of frequency of public engagement activities was roughly similar regardless of URF cohort, i.e. these activities were being carried out throughout a research career following award completion (and presumably during the award too, we infer).

Table 3.6 Frequency of public engagement, knowledge exchange and national-level policy-making activities (URF alumni, by grouped year of completion of award)

	Since 2017	2008-17	1998-2007	Pre-1998	Total
Public engagement					
> 1 per year	45.7%	46.1%	48.1%	43.3%	46.2%
1 per year	44.7%	44.6%	40.6%	41.7%	42.6%
Never	9.6%	9.3%	11.3%	15.0%	11.1%
Knowledge exchange					
> 1 per year	28.7%	32.6%	39.9%	34.7%	35.0%
1 per year	29.8%	29.0%	31.0%	30.5%	30.1%
Never	41.5%	38.3%	29.1%	34.7%	35.0%
Policy-making					
> 1 per year	6.4%	16.6%	20.3%	23.9%	17.7%
1 per year	33.0%	23.3%	26.9%	25.6%	26.5%
Never	60.6%	60.1%	52.8%	50.4%	55.8%
N	*94*	*193*	*212*	*117*	*616*

On the other hand, somewhat higher proportions of alumni in earlier cohorts undertook knowledge-exchange activities, especially cohorts competing awards prior to 2008, than of

those completing awards since 2017 analysed here. A similar and somewhat more marked difference was seen in relation to policy-making – with only 6% of recent alumni participating in this type of activity more than once per year but over 20% of those who completed their award prior to 2008. Overall, these results, and trends, were very similar to those observed for URF alumni in the previous Career Pathway Tracker.

3.7. Scientific and research achievements

3.7.1. Personal recognition

In the survey respondents were invited to list any significant national or international prizes or awards that they had been awarded during or since their fellowship. Amongst the 98 URF alumni who completed awards since 2017, 39 listed awards or other recognition. This included 24 who had been awarded a prize or medal, in many cases by national or international subject associations or similar bodies, 10 who had been elected to some kind of fellowship or other recognition, and 9 who cited that they had won an ERC Starting or Consolidator Grant.

Amongst all URF alumni respondents, 335 (or 58%) listed a prize, medal, fellowship or other form of recognition, including prestigious grants. Textual analysis of selected terms used to describe these forms of recognition revealed the most common to be those in Table 3.7. Time did not allow for the fully detailed analysis that would be necessary to determine the nature of changes made to the open-ended submissions by URF respondents updating their CPT1 responses. However, textual analysis suggested that as many as 45% of those who responded to both surveys (*N*=472) had altered their previous response in some way – from which we could infer that 45% have obtained some further form of recognition in the last five years.

*Table 3.7 Frequency of terms most commonly used to describe awards or other recognition by URF alumni (*N=*335)*

Term	Citations (N)	Term	Citations (N)
Fellow/fellowship	134	Royal Society (other than FRS)	121
Award	112	FRS (Fellow of Royal Society)	41
Prize	70	ERC (European Research Council)	37
Medal	19		

3.7.2. Commercial achievements

A new element of the CPT2 surveys was overtly to ask alumni to record up to two commercialisation, economic- or industry-related achievements that they considered important. 186 of the URF alumni provided at least one such 'achievement', including 18 (about one in five) of the most recent cohort of URF alumni. Analysis by coding these responses into key themes revealed that the most popular activities described were those in Table 3.8, including at least 54 alumni with patents and numerous examples where their technology or outputs were being used in industry and/or they had played a key role in setting up or developing collaboration with one or more industry partners. 25 stated that they had founded or co-founded a spin-out and a similar number founded or co-founded another form of new

company. While much smaller in number, there were also examples where the technology, process or output of a URF had been offered on an open (or open source) basis, in addition to cases where it had been commercially licensed.

Table 3.8 Frequency of description of types of commercial achievements by URF alumni (from coding of open-ended responses, N=*186)*

Theme	**Respondents (N)**
Patent/s authorship	54
Licensing to industry	9
Technology/process/output used in industry without commercial patent/licensing	34
Establishment/key role in development of industrial collaboration	23
Founder/co-founder of spin-out	25
Founder/co-founder or other company	27

While there were a vast number of examples in total that are worthy of sharing, the following are examples drawn purely from the most recent group of URF alumni (completing awards since 2017), to illustrate how quickly some URFs are contributing to different forms of economic and societal benefit. The first two of these examples relate to commercial activities, whereas the following two are examples of open source or non-profit activities:

> *"In 2017 I co-founded a spin-off to produce and commercialise an optical fibre of my invention. The company grew to ~90 employees. In December 2022 we sold it to Microsoft. Microsoft is currently making very significant investments to further enhance the technology, generating even more jobs for the local economy and developing what could become a revolutionary product for datacentre interconnections."*
>
> *"We have developed several patents on graphene-based membranes for water filtration. Currently, several industries are collaborating with my research team to develop and scale up this technology to produce cheaper drinking water and solve environmental pollution issues using filtration technology."*
>
> *"I founded the not-for-profit software company […] to promote industry-academia partnerships supporting use of open-source scientific software in academic and industrial drug discovery. The partnerships between [company] and UK-based biotech and SMEs are contributing to the economic competitiveness and innovation excellence of the country."*
>
> *"I created and maintained several scientific software products that are publicly available. My software products have been widely used by hundreds of researchers worldwide in thousands of publications (as evidenced by the citations to my software papers). I keep receiving emails of gratitude and praise for making my software available."*

3.7.3. Other achievements

Respondents were also invited to describe briefly up to two other personal achievements of which they were particularly proud, beyond their published scientific research outputs and

commercialisation-related achievements. This drew responses that together provide very rich insights into the many and varied activities and achievements of URF alumni. Thematic analysis of these responses, from over 500 URF alumni, revealed the most prominent/common types of achievement to be those in Table 3.9, where they are listed by the number of respondents describing them. These results bore many resemblances to findings from a similar question in the previous survey, with the top three most common topics the same (albeit in a different order), while there some differences in terms of other topics (partly due to use of a revised set of themes for analysis). Pride in the achievements of research group members and/or others that URF alumni had trained or mentored was the most commonly cited topic in this survey (which is also considered in a later chapter). Meanwhile, leadership of institutional structures or facilities – and/or also of scientific or disciplinary communities – also emerged as common themes. On the other hand, public engagement was substantially less commonly mentioned than in the first survey five years ago, possibly because it has become more 'mainstream' as an activity or expectation. Other less common topics (although mentioned by 10 or more URF alumni) included activities promoting equality and diversity, contributions to policy-making and what might be summarised as personal resilience (i.e. survival in a competitive research world).

Table 3.9 Frequency of description of types of personal achievement by URF alumni, for most common themes (from coding of open-ended responses, N=*502)*

Theme	**Respondents (N)**	**Theme**	**Respondents (N)**
Training next generation of researchers	55	Grants/funding secured	26
Own career progression / position	43	Collaborations/networks	25
External/community recognition	41	Novel discoveries	21
Institutional/facility leadership	40	Commercial leadership	17
Scientific/disciplinary leadership	39	Teaching	13

Amongst those URF alumni who responded to both the CPT1 survey in 2018 and this one, almost half (*N*=248) updated the answer that they had provided in the previous survey or provided a new response where they had not. This cumulative set of open-ended responses has become a powerful body of evidence about the contributions and achievements of URF alumni through the decades that the scheme has been in existence.

The following is a small selection of comments about these achievements, selected purely from URF alumni since 2017, which build upon the more extensive range of similar examples of achievements from URF alumni contained in our previous report and in the accompanying URF showcase document.

> *"Over the last few years, I've made a change of research direction using a new model plant and answering evolutionary questions. What originally started as a side project has galvanised other groups and is now there are several groups in Nottingham and collaborating universities working on the same theme. I have grown a community!"*

"Being co-chief scientist on the maiden science voyage of the new UK research vessel, the RRS Sir David Attenborough in 2023."

"Invitation to speak at "International Congress of Mathematicians" in 2022, the most prestigious conference in mathematics."

"The fibre concept I conceived in 2014 based on simulations has now become a commercial reality. We have been able to produce such a fibre and demonstrated world-record performance. We have then cabled it and installed it in multiple locations across the globe. Several hollow core fibre cables of such a design are currently transmitting real-time data, providing the end users with a uniquely low transmission latency."

"In 2022 I published my first popular science book as a super-lead title with Bloomsbury and Knopf, with 12 international translations. It received major international acclaim and publicity. This book was the culmination of a career-long dual professional interest in both research and science communication, and was possible due to the freedom given to me by the RS URF to follow my own direction. It notably also restored the roles of women physicists who had been traditionally overlooked into the narrative of key moments in experimental physics."

"I have worked with policy makers to contribute the results of my research to policy development, including through editing two briefings for the Parliamentary Office of Science and Technology, and serving as a technical adviser to the House of Commons Science and Technology Committee."

"Recently, my third PhD student started her independent academic career in Spain. I am hugely proud of what she has achieved and feel that the achievements of my former team members are a major legacy of my career."

3.8. Summary of evaluative findings

The first report from the Career Pathway Tracker project in 2018 provided strong evidence for the impact of the URF scheme, based on CPT1 survey results from alumni across the lifetime of the scheme at that point. The CPT2 surveys contain responses from almost 100 alumni respondents who completed an award subsequent to that prior research, while around 50 alumni from early periods of the scheme have now retired are exiting the tracking project. The current results therefore reveal an updated snapshot of outcomes from the scheme.

For the most part, the results continue to reinforce and confirm the very positive outcomes and impacts recorded in 2018. Dominantly, URF alumni are continuing in academic careers in which they obtain established, open-ended positions of independent research leadership. Three quarters have a Professor-level or more senior post, and there is evidence that these posts are being reached more quickly (three quarters of the most recent cohort obtaining this at award completion, which was higher than for those in an equivalent time period in 2018). Almost all have achieved the metrics of leadership, in terms of published outputs, winning grant funding, hiring research staff and supervising successful doctoral students.

There is also evidence here of the leading contributions that many are making in their fields and institutions, for which large numbers have obtained external recognition, as well as in training the next generation of researchers. Revised questions in this survey offer more specific insights into the research groups that are being led and the extent and nature of

commercialisation emerging from the work of as many as one third of all URF alumni respondents.

The scheme is shown to have a positive retention effect, attracting international researchers to the UK and retaining many of them, while also retaining outstanding UK scientists in the country, for substantive periods of their careers. Over time that retention effect is seen to diminish as many of the international researchers do eventually leave the UK and a small proportion of UK URFs also ultimately migrate abroad. At this point (40 years on from launch of the scheme) the overall picture returns to one of roughly a steady-state, rather than of net retention. However, the evidence suggests a retention effect for 20-25 years of a typical URF's career including their award, which is likely to have been a particularly crucial and productive period of their career. Results showing the high extent of international collaborations are given in a later, dedicated chapter.

4. Dorothy Hodgkin Fellowship

4.1. The scheme

Launched in 1995, the Dorothy Hodgkin Fellowship (DHF) scheme aims to offer a first step into an independent research career for outstanding scientists who require a flexible work pattern. Eligibility is on the basis of personal circumstances, such as parental or caring responsibilities, or a health condition, that require/s such flexibility, for early-career scientists with up to six years of postdoctoral experience and who do not hold a permanent post. The scheme was and remains open to all researchers that meet these criteria, although a significant majority of those funded have been female early-career scientists with young families. While its support offer, duration and objectives are currently similar to those of the URF, earlier in the scheme's lifetime the award offered a shorter period of funding (four years up to 2012, and then five years). In 2022/23 the Society awarded 7 DHFs, while the maximum funding value per award is £1.8 million (in the 2024 application round, similar to the URF).

The first Career Pathway Tracker survey (CPT1) obtained 98 responses from DHF awardees, plus a number who had subsequently obtained a URF too, which comprised a response rate of 76% of DHF alumni at that point. In the CPT2 surveys, we obtained a total of 113 responses from DHF alumni, plus a further five who subsequently undertook and completed another Research Fellowship (four URF, one SHDF), although 35 who had replied to the previous survey did not engage this time. In all, we believe over 75% of the roughly 200 DHF alumni to date have replied to at least one of these surveys.

On the basis of these new survey responses, a small proportion of DHF alumni were male (6%), remembering that data from these alumni may give a retrospective view of overall participation, as even for recent alumni the award will have been made at six or more years ago. Rather similar to the profile of recent URFs, 55% of all DHF alumni responding to the survey were of UK nationality, with 33% from an EU nation and 12% another nation.[8] The proportion of respondents reporting a disability was 8% (noting that the survey sought current disability, rather than whether this was the case at the time of the award). The extent of postdoctoral experience of DHF alumni respondents to the survey ranged from almost nil up to eight years, with a mean of 3.6 years (and median 4 years), although with some evidence that amongst the most recent alumni this had increased to over five years. Thus, in parallel with the URF scheme, the extent of postdoctoral experience prior to award appears to have been increasing.

As the scheme is positioned to offer flexible support, it is interesting to note that 13% of respondents reported that they had undertaken the award on a part-time basis and 17% had had periods during their award when they were part-time, so 70% had nonetheless participated full-time. Amongst current DHF awardees, the Royal Society reports that both these proportions are higher, with around one quarter in each category. It is unclear whether these differences genuinely reflect changes over time, or a bias in the alumni sample. However, both sets of results contrast with the almost entirely full-time nature of URF awards within the period covered by this study. A small proportion (around 5%) of DHF alumni in the survey reported

[8] Amongst DHF alumni respondents completing an award since 2017, the majority were not of UK nationality (13 out of 18 of known nationality)

absence from work for a number of months during their award, but this proportion did not appear to be higher than amongst URF alumni.

The modest extent of the scheme presents some challenge in terms of presentation of results. Only 19 respondents completed a DHF award since 2017, which means quantitative results for only this most recent cohort will not be statistically robust. Accordingly, in the majority of cases the results presented are for all DHF alumni respondents, while in some cases a result for the most recent may also be given as an illustration of a potential variance with time.

4.2. Current employment

4.2.1. Employment sector and location

Of the 113 DHF alumni respondents, all but two were in employment (and none reported that they were self-employed). 88% of the employed DHF alumni respondents were employed or working in academia/HE or a public research institute. Of the 13 respondents who were not in academia/HE, all but two were working in STEM-focused industries or organisations (and the other two working for banks). The organisations for which they worked included a hospital, both large corporate and small STEM companies, a publisher, a professional association, a philanthropic organisation and a charity. As for the URFs, it is likely that these results under-represent all those working outside academia/HE, because some or many of those we were unable to engage may be working in other sectors where they are less traceable.

In total, 87% of those in employment stated that they were currently research-active, comprising 96% of those working in academia/HE but only four of the 13 who were working in other sectors. Despite this, many of those working outside academia/HE and saying they were not research active had role titles suggesting their work was related to research.

As noted below, 72% of DHF alumni respondents were working in the UK when surveyed. UK work locations for those in academia/HE were analysed, as undertaken for URF alumni. This showed that 45% were still at the institution at which they had held the award, with 66% currently at a Russell Group institution, 26% at another type of university and 9% at a specialist institution (a somewhat more ‘diverse’ profile than for URF alumni). In terms of geographical location, 80% of their institutions were in England, with 37% in London and the South East, although there were DHF alumni at universities in every English region, in Scotland and in Wales (albeit small numbers in most regions). Again, as for URF alumni, this suggested slight outward spread of locations of employment, compared with where they held their awards.

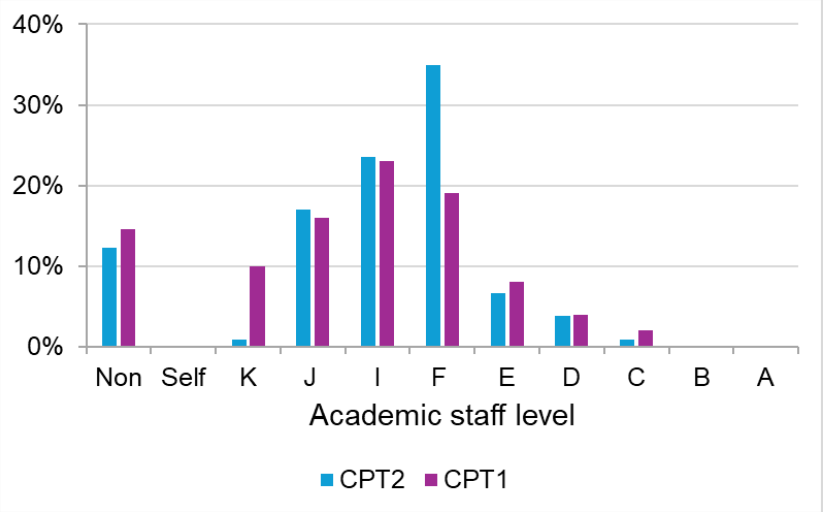
4.2.2. Level of current employment

For DHF respondents in academic employment, we again applied the UCEA/HESA academic staff level categorisation to their job titles, as for URF alumni in the last chapter. On this basis, the levels of current employment for DHF alumni respondents are in Figure 4.1.

This shows that the most common job level was that of Professor, which was the case for 35% of respondents (and 40% of those in academic positions), while 46% had reached this level of seniority or surpassed it (which was 52% of those in academia). Comparison of these results with those from the CPT1 survey, also shown in Figure 4.1, reveals a higher proportion now to have a post at Professor level, which would be consistent with progression of some of the alumni in the intervening five years. While only a small sample, it was also notable that around one third of the most recent alumni had a job at the level of Professor, i.e. achieved within five

years of completing their award. Further exploration of the early-career trajectories of DHF alumni is attempted in the next section.

Figure 4.1 Level of current employment position of DHF alumni respondents (CPT2: N=*110), with results from CPT1 survey (*N=*96) for comparison*



Non	Non-academic occupation
Self	Self-employed
L	Postdoc
K	Research Fellow
J	Senior Lecturer
I	Reader
F	Professor
E	Division leader
D	Department Head
C	Executive Dean
B	Pro Vice-Chancellor
A	Vice-Chancellor

4.2.3. Employment country and retention

In total, 72% of DHF respondents in employment were currently working in the UK, with 15% working in an EU country and 13% another country (Table 4.1). As seen for URF alumni, the proportion of UK nationals working in the UK was higher (83%) than the proportion of non-UK nationality (58%).

Table 4.1 Location of employment of DHF alumni respondents, with broad nationality

	All DHF alumni		
Nationality	**All**	**UK**	**Non-UK**
Location			
UK	72%	83%	58%
EU country	15%	7%	24%
RoW country	13%	10%	16%
N	*109*	*54*	*45*

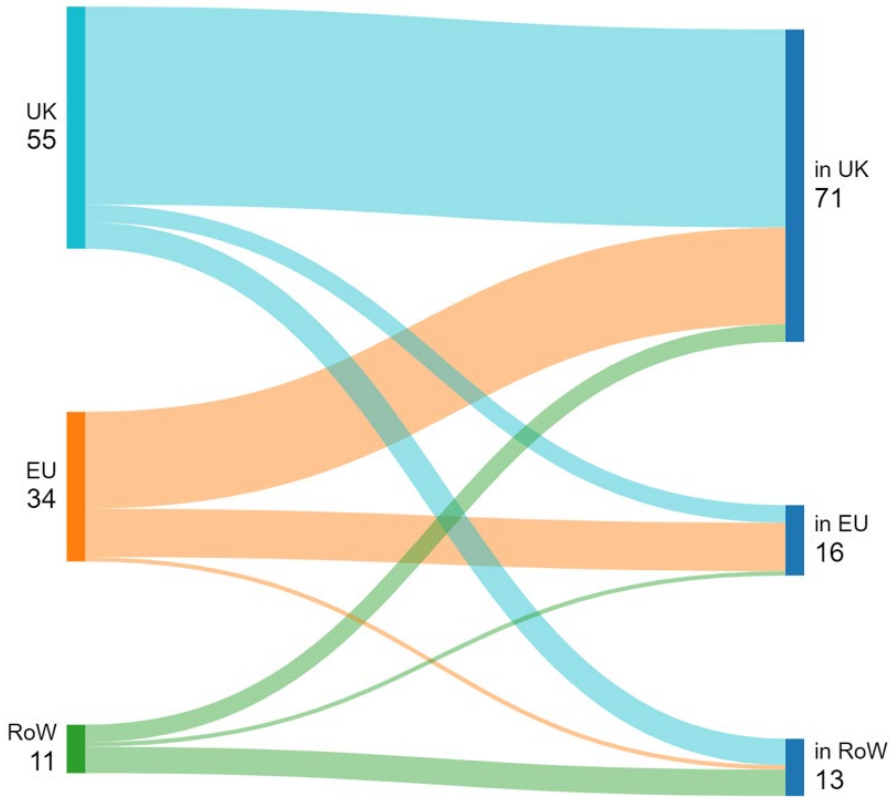
Analysis of the nationality of who were working outside the UK revealed that two thirds were non-UK nationals, but the third who were of UK nationality was evidence that a small proportion of all UK-national DHF alumni (perhaps one in ten, in total) were moving overseas with time.

The number of DHF alumni respondents who had completed awards since 2017 was small (*N*=19, although there was one respondent whose nationality and employment location were not both known), so similar analysis for this sub-group cannot be regarded as statistically robust. However, amongst this recent cohort, of whom the majority (13) were not of UK nationality, 14 were working in the UK at the time of survey, a similar proportion to that for all

DHF alumni respondents. Four of the five of UK nationality were working in the UK, and nine of the 13 known to be of another nationality were doing so too.

Taking a cumulative view of all DHF alumni respondents at the time of the CPT2 survey, the total number currently working in the UK (71) was higher than the number of UK nationals (54). We take this to indicate that the award has had a significant overall retention effect on awardees (as shown in the Sankey diagram in Figure 4.2).

*Figure 4.2 Sankey diagram showing nationality of DHF alumni respondents (left-hand axis) and current location of employment (right-hand axis), where both nationality and location known (*N=*100)*



4.3. Achievement/impact metrics overall

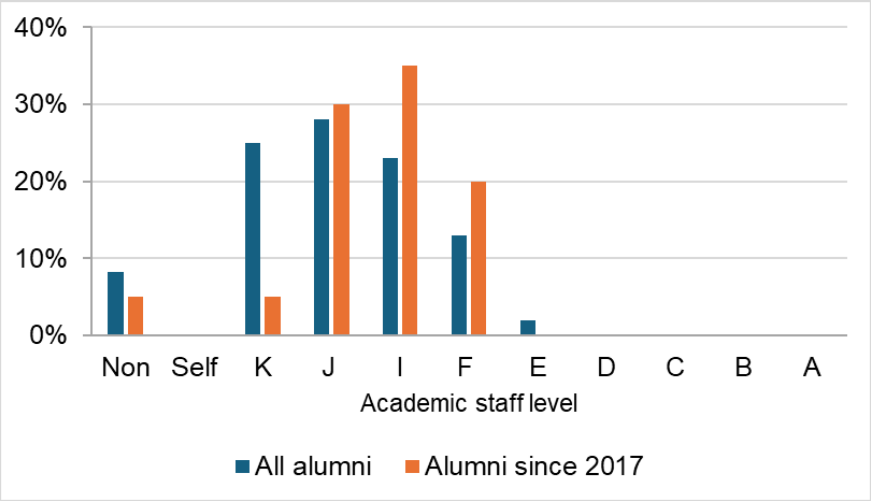
4.3.1. First employment positions

The career-related objectives of the DHF scheme are somewhat broader than for the URF scheme, commensurate with the wider range of experience of eligible applicants for the DHF scheme. Those eligible range from researchers with up to six years of postdoctoral experience using the award to establish independence (very similar to the purpose of the URF) to those who have only recently completed their PhD. Thus, the objectives are described as to support awardees to take their "first steps" in developing research leadership. Nonetheless, examination of the employment circumstances of alumni immediately after completion of their award should give some indication of the nature of those first steps.

Figure 4.3 shows the staff level of the first positions gained by DHF alumni, using the same scale as in Figure 4.1, illustrating that amongst the entire DHF response sample around 15%

immediately obtained a Professor- or higher- level post, with the most common levels being J (including Assistant Professor, Lecturer or Research Fellow) or I (Reader, Associate Professor, Senior/Principal Research Fellow). This analysis includes those within the alumni that progressed to a URF (categorised as a Level J position). Interestingly, amongst DHF alumni since 2017, the profile suggested somewhat more senior positions being gained immediately after award completion (with 20% gaining Professor level immediately, while posts at Level I, equivalent to Reader, were the most common). However, as this sample was only 19 individuals, this was not a statistically robust difference.

Figure 4.3 Level of job position obtained following completion of DHF award (all DHF: N=*109; DHF alumni completing awards since 2017:* N=*19)*



Non	Non-academic occupation
Self	Self-employed
L	Postdoc
K	Research Fellow
J	Senior Lecturer
I	Reader
F	Professor
E	Division leader
D	Department Head
C	Executive Dean
B	Pro Vice-Chancellor
A	Vice-Chancellor

Responses to another question specifically about the year in which DHF alumni had obtained a professor-level post, for those that had done so, suggested that the mean length of time taken was seven years. Looked at another way, about 60% of the DHF alumni working in academia who completed their award more than seven years before the survey had reached this level of position.

4.3.2. Achieving permanent employment

Just under 90% of all DHF alumni giving this information in the survey indicated that they had an open-ended (permanent) contract of employment, and 95% of those working in academia. However, it was notable that a significantly lower proportion (around 60%) had achieved this by the time of or immediately after completion of their award. Around three quarters had done so within three years of completion. However, amongst the small sample of recent DHF alumni, about three quarters achieved a permanent position immediately after their award.

4.3.3. Other research-related metrics

The proportion of DHF alumni survey respondents who had published a significant paper as a principal investigator by the year they completed their award was 78%, and a total of 96% reported that they had done so by the time of the survey (and 98% of those who were currently in an academic career). While the proportion who had done so during their award was lower than amongst URFs, it should be remembered that for the period of the scheme studied the

DHF was targeted at researchers with less postdoctoral experience than the URF and the award was of significantly shorter duration than the URF. Thus, some difference might be expected. Interestingly, all but two of the alumni completing awards since 2017 had published such a paper by the year they completed their award (i.e. a higher proportion than seen across the lifetime of the scheme).

In total, 85% of all DHF alumni respondents reported that they had successfully won a major research grant, and this proportion was 90% amongst those currently in an academic career. 58% had done so during their award or in the year that they completed it. The proportion amongst recent DHF alumni was higher at 68% by the year of completion.

90% of DHF alumni had recruited at least one postdoctoral researcher by the time of the survey, and this was 94% of those currently in an academic career. 69% had done so by the time they completed their award (or in that same year) and, again, amongst the small sample of recent alumni this was higher at 79% prior to completion. At the time of survey, 67% of research-active DHF alumni had at least one postdoctoral research staff working for them, 59% of them managed other researchers and 51% technicians or other professional staff. Over 90% of them were currently supervising at least one doctoral student. More on the cumulative contribution of DHF alumni to training researchers follows in a later chapter.

On the other hand, the proportion who had supervised a doctoral student to successful completion by the time they finished their DHF award was much lower, at 38%, than amongst URF alumni. This was presumably because of the shorter duration of the DHF award – i.e. only doctoral students who started very early in the award would have time to complete their studies during the period of the award, in many cases. However, viewed over the cumulative period until now, 85% of DHF alumni respondents (and 91% of those now in an academic career) have supervised at least one doctoral student to completion. Amongst recent DHF alumni, 68% had supervised a doctoral student to completion during their award, presumably reflecting the extra year of duration of the award for these alumni, compared with their earlier counterparts.

Summarising these metrics in tabular form (Table 4.2), these results indicate that high proportions of DHF alumni demonstrate many of these measures of achievement in relation to developing independent research leadership, although fewer of them have achieved a Chair or Professor role than of URF alumni.

Table 4.2 Proportions of DHF alumni survey respondents achieving measures of establishment of independent research leadership (all DHF alumni respondents: N=*110; DHF alumni respondents completing an award since 2017:* N=*19)*

	All DHF alumni		**DHF alumni since 2017**	
	By year of completion	To date	By year of completion	To date
Obtained permanent position	60%	90%	74%	84%
Obtained professor-level post	15%	46%	20%	42%
Won significant research grant	58%	85%	68%	84%
Published significant paper	78%	96%	89%	95%
Recruited research staff	69%	90%	79%	84%
Supervised doctoral student to completion	38%	85%	68%	74%

While the proportions achieving some of these metrics by the time they completed their DHF award are substantially lower than for URFs reported in the previous chapter, the results seem entirely consistent with the aims and duration of the award in the period studied, i.e. achievement of first steps towards research leadership. It is also interesting to note that the limited evidence to date from recent DHF alumni indicates that higher proportions are achieving all of these metrics, which could reflect the greater duration of the award in their case (than for earlier alumni). More insights into the leadership roles that DHF alumni have been playing are considered in the next section.

4.4. Perceptions of impact and experiences of the award

Results for all DHF alumni responding to the recent survey are considered here, although the bar charts are presented with options in the same order as for recent URFs in the last chapter (hence comparison can be made of any differences in the relative importance of different options for alumni of the two schemes). Figure 4.4 illustrates strong positive perceptions of the impact of the award on DHF alumni careers, with 90% suggesting that the award made it easier for them to secure permanent employment and for over 90% a significant difference to their career path and faster progression (similar to the perceptions of recent URFs). The extent of impact in relation to level of seniority reached to date and how senior colleagues viewed alumni were somewhat less strongly perceived than the effect on achieving a position and career path and progress, but with over two thirds of respondents recognising these as positive impacts. However, there was some evidence that more of the DHF alumni (than URFs) saw a strong effect on the way that senior colleagues perceived them.

Comparison of results for recent DHF alumni only, while a small sample, suggested that this group perceived relatively greater extents of impact in all of these ways, than DHF alumni as a whole; for example, 89% of them strongly agreeing that the award made it easier to secure their first permanent position (higher than the 80% overall for all DHF alumni).

Figure 4.4 Extent of agreement with statements about the impact of research fellowship on respondents' career (DHF alumni: N=*110)*

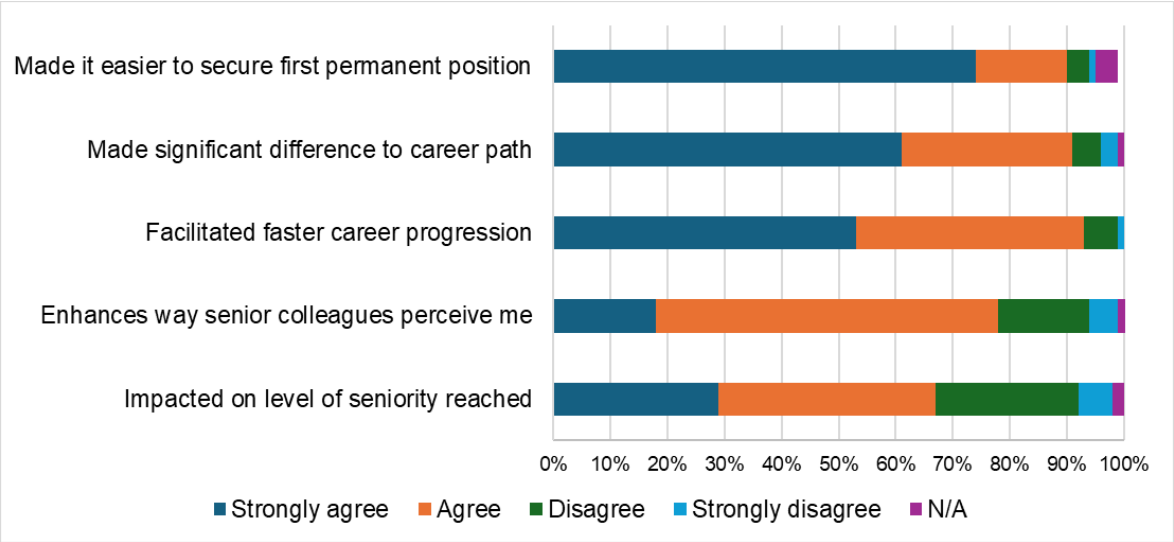
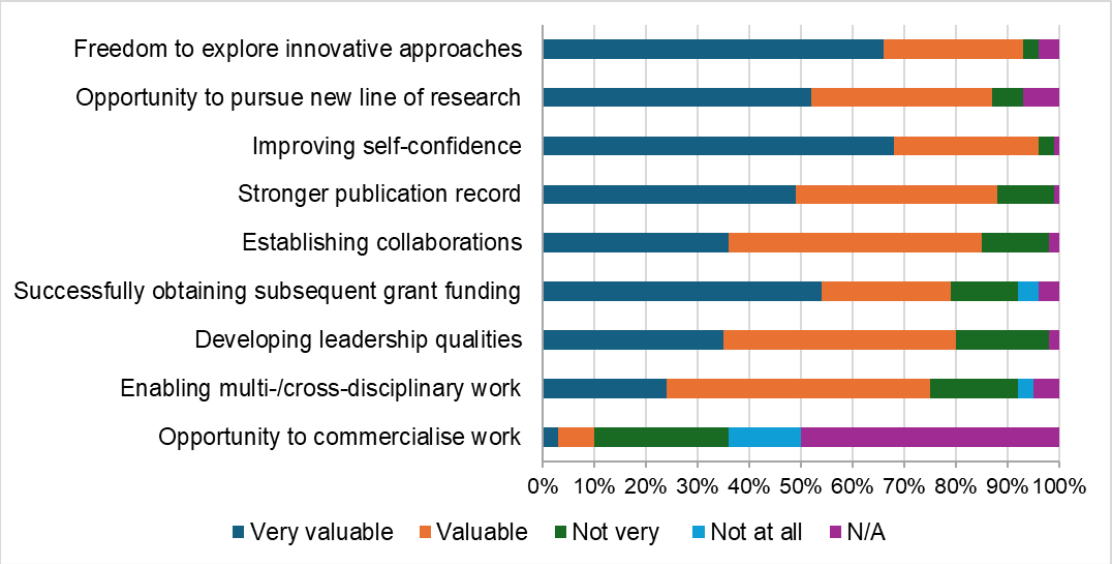


Figure 4.5 illustrates the perceptions from DHF alumni about the value of the award on a range of aspects of development of research leadership. These reveal mostly very positive attitudes about the value of the award on particular aspects of the development of research leadership. As for recent URF alumni, they show very strong perceptions of value in many respects, although DHF alumni rated the value of the award in terms of raising confidence, and also on helping them gain subsequent funding, relatively more highly rated than did their URF counterparts. For DHFs, the effect on self-confidence was rated even more highly than the practical freedom to explore new research approaches. More detailed examination showed that results for recent DHF alumni were very slightly more positive still, in all respects, other than in relation to commercialisation.

Figure 4.5 DHF alumni respondents' perceptions of the value of their fellowship on a range of aspects of development of research leadership (all DHF alumni: N=*110)*



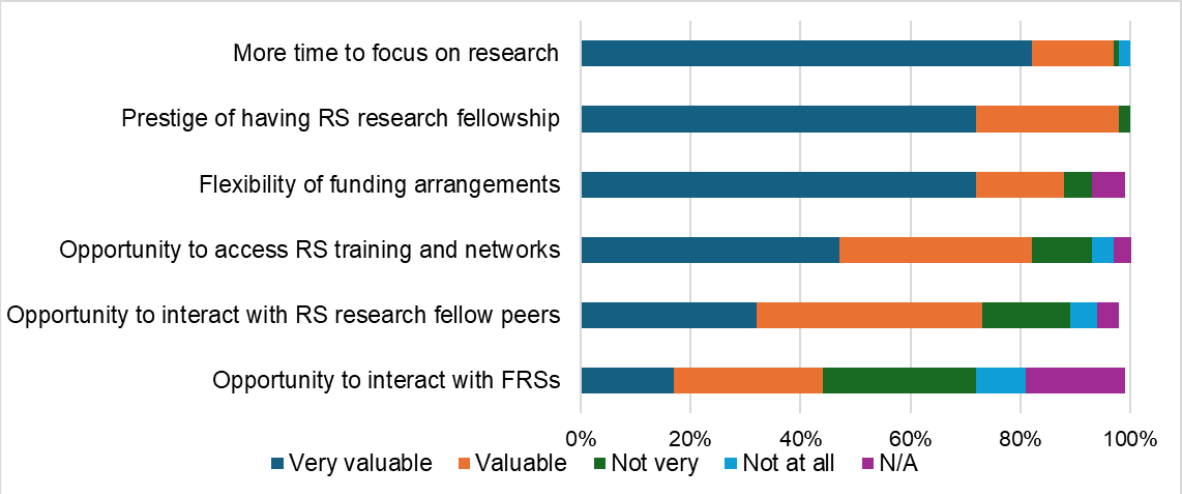
Some of the open-ended comments made in relation to the value of the award attested particularly to the confidence- and independence-building impacts, as well as securing a successful balance of progressing in research while also raising a family:

> *"Strengthening my independence within academia."*
>
> *"Gave me the confidence to be a mother and a scientist on my own terms."*
>
> *"Helped me secure an academic position, enhanced skills for interdisciplinary research, enabled me to thrive in my career while having caring responsibilities."*
>
> *"Confidence as a female scientist and a network which has allowed me to continue in science. I would not [have continued] without this."*

When asked in more detail about the extent of value of different potential benefits of the award, towards development of research leadership, DHF alumni gave similarly high ratings as URF alumni in relation to the high value the additional time it availed to focus on research and the prestige of having the award. A very high proportion also rated highly the value of the flexibility of the funding. More of the DHF alumni valued the opportunity to access the training and development opportunities offered, than of URF alumni, which we infer may relate to the higher

proportion of women amongst the DHF alumni (as, typically, we note from other professional development surveys of researchers, women are more receptive to these opportunities than men, on average). The majority also saw some or great value in being able to network with peers and nearly half valued the opportunities to interact with Fellows of the Royal Society. Recent DHF alumni rated even more highly the protected time for research (94%) and the prestige (100%), compared with DHF alumni as a whole.

Figure 4.6 DHF alumni respondents' perceptions of the value of different potential benefits of their fellowship towards development of research leadership (all DHF alumni: N=*110)*



Respondents were invited to summarise the difference that they felt the DHF had made to their career, through open-ended comments. These responses comprised a range of descriptions of differing ways in which the aims of the scheme are being met. Many respondents cited similar benefits to those articulated by URF respondents in the last chapter, such as the opportunity (freedom) to pursue personal research interests, which could be more innovative or 'risky' than would have been possible with other funding, over a sustained period:

> *"If you had asked me a few years ago, my answer would likely have been that it helped me work with a range of collaborators to work on various research problems and was impactful in helping me secure a permanent academic position. Reflecting a bit further removed, the reality is that the RS fellowship encouraged me to explore more challenging questions and a bolder research vision than is generally tolerated by funders/ grant reviewers. It has been a sad transition, in that sense, out of the fellowship because it is hard to continue to get support for my ambition and creativity in a research world that seems to increasingly value incremental work. That all said, I also reflect on how empowering it was to get a fellowship and for my research vision to be appreciated."*

> *"The RS DHF gave me freedom to pursue my own research ideas, plan my own funding and my own time, not dictated by another PI. The long stretch of the fellowship allowed me to explore new ideas more freely and do more high-risk high-gain research. The fellowship was crucial to allow me work flexibly and also to become independent of previous research groups."*

The impact of the scheme on establishing independence as a researcher, through a good duration of sustained but flexible funding and other scheme benefits, was articulated by many:

"The prestige of a Royal Society Fellowship allowed me to secure a permanent position in my institution. I also got leadership skills that helped support a successful [ ] application. I learnt a lot about leading a research team as I had the opportunity to supervise a PhD student and hired two research assistants during the DHF. Training opportunities were very appreciated."

"The RS fellowship allowed me to pursue innovative and highly risky research, to carve my research niche that allowed to obtain an independent PI position. It also helped extend the time required to set up my independent research group during which I had my daughter. In the typical time window of a tenure-track appointment, it is unlikely that I would have been able to demonstrate my worth, and the extra time of the RS appointment was essential at a most critical time of my career and personal life."

"It was the make or break in my career, I went to full prof[essor] within 6 years of obtaining my PhD in large part thanks to the DHF."

However, most prominent were comments reflecting the essence of the DHF, i.e. to support researchers with family or caring responsibilities and retain them within science/academia. Many of these reflected the scheme when it was particularly focused upon those with parental responsibilities, so it will be interesting as future alumni emerge to witness the benefits of a wider range of individuals who require more flexible support:

"*It allowed me to focus on research in a critical period of my life with small children. Probably I would have given up research without the support and the flexibility of the RS fellowship. Thank you for the support!"*

"My DHF fellowship came at a critical time in my career where I had two small children and lots of research ideas, but was struggling with how I would manage the teaching load associated with a Lecturer post in the UK. The fellowship removed this pressure and also gave a huge boost to my confidence as a researcher."

"I wouldn't have stayed in academia had I not been awarded my Royal Society DHF. It has been an amazing opportunity and opened up many opportunities. It allowed me to pursue my independent research - >10 years on, I am still in academic research."

"Support from the Royal Society got me through and sustained me during the hard years as an early-career scientist having come back to academia after working outside academia for 2 years and also during the time that I raised my family. I just don't see how that opportunity to come back and to be supported during a period or relatively slow productivity would have been viable any other way. The support allowed me at that time to continue - and in the long-term - excel. I'll always be uniquely grateful for the support at that time."

"The RS fellowship I received was absolutely essential for my career. At that time I had a 3 month old baby, 3 months left on my postdoc contract, no other postdoc contracts were available in my field and location at the time, and other applications had all been rejected. Without the possibility of moving, I would have had to leave academia if I had not been awarded the fellowship."

"I wouldn't still be in academia without the DH fellowship. I chose to have children during my DHF and, owing to the nature of the DHF felt that I could do so on my own terms: I was the first RS fellow in my department to take maternity leave for my first child and the first academic to take maternity leave in my current department for my second child. I chose to take the full leave entitlement, unusual for academics, and I continue (10 years later) to

work part-time. I would never have had the confidence to do this without the fellowship and it has meant the difference between me staying in academia and leaving it. The fellowship also gave me flexible time and confidence to focus on my research, it gave me respect from my colleagues (especially more junior colleagues) and the time and space to build up an independent research direction. Overall, it made a huge difference to me."

4.5. Other contributions

All recent DHF alumni, and 92% of all DHF alumni, responding to the survey reported that they were active in public engagement activities (with over two thirds of the former reporting that they did this more than once per year, Table 4.3); these were slightly higher figures than seen amongst comparable URF alumni.

Roughly similar proportions of DHF and URF alumni took part in knowledge exchange or commercialisation activities, around two thirds. Overall, around half of DHF alumni were active in national-level policy-making, which was a similar level to URF alumni, but this was lower amongst recent DHF alumni (26%) than recent URF alumni (40%).

Table 4.3 Frequency of public engagement, knowledge exchange and national-level policy-making activities of DHF alumni

	All DHF alumni	DHF alumni since 2017
Public engagement		
> 1 per year	58.5%	68.4%
1 per year	33.0%	31.6%
Never	8.5%	0%
Knowledge exchange		
> 1 per year	40.6%	36.8%
1 per year	21.7%	15.8%
Never	37.7%	47.4%
Policy-making		
> 1 per year	17.8%	15.8%
1 per year	32.7%	10.5%
Never	49.5%	73.7%
N	*106*	*19*

4.6. Scientific and research achievements

4.6.1. Personal recognition

In total, 39 of the DHF alumni responding to the survey (just over one third) listed some kind of disciplinary or institutional recognition, or a national or international prize or award that they had been awarded during or since their fellowship, although several overtly stated that they did not put themselves forward for such recognition as they believed it contributed to an over-concentration of funding through accumulated advantage. That said, amongst the DHF alumni listing specific recognition, 27 cited some kind of prize (12), medal (8) or other award (7), while 18 alumni cited various fellowships they had been awarded. Six mentioned ERC Starter or Consolidator Grants that they had won since their DHF. While this did not emerge directly from the survey results, we understand that four DHF alumni have been elected to become a Fellow

of the Royal Society (FRS) to date. Analysis of responses from the most recent alumni, who had completed their award since 2017, revealed that six of these 19 alumni cited a prize or medal.

4.6.2. Commercial achievements

Roughly one in four DHF alumni in the survey (*N*=26) responded to the question seeking commercialisation, economic- or industry-related achievements that they considered important. These included around one in five of the most recent DHF alumni, which was the same proportion as amongst recent URF alumni reported in the last chapter.

Analysis of these responses using the same themes as for responses from URFs revealed that the most popular activities described were collaborations with industrial partners that alumni had either established or were in the process of developing (cited by 15 respondents), including many which had led to development of collaborative doctoral studentships. Three DHF alumni cited a specific patent that they had secured but two more had applications in progress, while four others described industrial adoption of something they had developed. Three had founded or co-founded a spin-out company and three more founded or co-founded another form of start-up company.

> *"I am a co-founder of a start-up company that is focused on developing metal oxide nano and microparticles using a low temperature, low emissions, low energy, low waste method. Process is patented."*
>
> *"In 2011 I set up a unit within our department to provide a service to test new insecticides against mosquito populations. This has now grown to a team of 18 staff and last year we set up a spin out company to further develop our activities. We work with many of the major agrochemical companies to evaluate new products for prevention of mosquito borne disease. The work is important to help accelerate the development of new vector control tools and it provides a good opportunity for interactions with industry partners."*
>
> *"We have been involved in a number of projects with Tata Steel UK focused on industrial challenges. This has led to 5 postgraduate studentships over the past six years."*

Overall, while nearly as high a proportion of DHF alumni (as URF alumni) described a commercial achievement of some kind, the extent of that commercial development appeared on average to be somewhat less (i.e. proportionally fewer patents or licenses, and fewer spin-outs or start-ups established). This could partly reflect the shorter lifetime of the scheme, so there has been less time for these to develop, and/or that more of the DHF alumni had additional responsibilities outside their research which could have limited their ability to put additional time into commercial developments. Analysis also showed that a higher proportion of the comments made by DHF alumni used the word "we" when describing their achievements, than amongst URF alumni when describing similar achievements.

4.6.3. Other personal achievements

DHF alumni responding to the survey were also invited to describe briefly up to two other personal achievements of which they were particularly proud, beyond their published scientific research outputs. These responses were analysed using the same themes as for URF alumni (in section 3.6.3, and Table 3.9), revealing the frequencies of types of achievement in Table

4.4, where they are listed by number of citations (from a total of 125 comments in all). These results are in some ways remarkably similar to those from the URFs, with a similar ordering of frequencies, with one or two exceptions. Pride in the impact that the DHF alumni had had on training the next generation of researchers was cited by one in five DHF alumni (compared with around one in eight URF alumni), and a higher proportion of DHFs cited their achievement of a permanent senior research position, and/or their resilience in the face of other challenges within life to be able to continue to pursue high-quality research, than did URF alumni (relatively).

A lower proportion of the DHF alumni (than URFs) considered awards or other personal recognition as the achievements of which they were most proud, while relatively higher proportions of the DHF alumni cited leadership roles they played in their institution, public engagement activities and, especially, their contributions to enhancing equality, diversity and inclusion. While these comments and our analysis to date of them cannot be considered a quantitatively robust assessment of the contributions or achievements of the alumni, we note that a far higher proportion of DHF alumni are women (over nine out of ten) compared with URF alumni. It is therefore possible that the differences in results reflect other evidence in the sector for over-representation of women in organisation- or culture-/environment- focused roles in the UK research eco-system.

*Table 4.4 Most common themes of personal achievements related by DHF alumni (*N=*100)*

	Citations		Citations
Training next generation researchers	24	Grants/funding secured	12
Own career progression/position	22	Collaborations/networks	8
External/community recognition	10	Equality, diversity and inclusion	8
Institutional/facility leadership	14	Public engagement	6
Scientific/disciplinary leadership	14		

While the following selection does not do justice to the range and depth of their achievements, these extracts are provided as some illustration of their leadership:

> *"Appointment as Co-Chair of the International […] Program Science Evaluation Panel, 2019-2022. I was responsible for evaluating all proposals for drilling expeditions in this large international program, one of the longest running scientific organisations (>50 years), with each expedition valued at >$7-8 M."*
>
> *"Leading a multi-million pound international consortium with 12 partners in 8 different countries. This would normally have been led by someone more senior than myself, but I was picked for the role and rose to the challenge."*
>
> *"Being asked to become president of a learned society - because this indicates that my peers in my field consider me to have leadership status and respect and value my contributions."*
>
> *"In 2009 I was appointed as Professor of Cardiovascular Diseases at […] and thereby obtained my first permanent position. I am very proud of this milestone in my career*

and for obtaining a professorship at a successful academic institution, thereby recognising my scientific, educational and leadership qualities."

"I have obtained a permanent academic position while working part-time (because of family circumstances), so far an extremely rare career path enabled by [the] DHF in my field (engineering). I have since been able to advise many young researchers (male and female) in my faculty on ways of combining young family and academic career successfully."

"Being a role model for young scientists. A postdoctoral fellow employed on my grant published 4 good papers and went on to a position at the Crick Institute. She now has her own group at [University]."

"Supporting 2 of my PhD students to complete their PhDs, despite substantial personal challenges. Just as the Roy Soc supported me as an individual who needed flexibility, I have provided them with a supportive and flexible working environment, and each of them completed their PhD successfully by their respective deadlines. I am proud of them, and of myself for giving them what they needed to shine."

"I was [University] Academic Lead for Gender Equality and then [Faculty] Equity, Diversity and Inclusion Lead, which I currently hold. As a woman in a male-dominated area of science and as a parent and an autistic person, I have faced (and still face) various barriers to my participation and success in academia and this experience, together with my wider understanding of the inequities that exist in academia and society more broadly, inspires me to take on leadership roles in this area to bring about change."

4.7. Summary of evaluative findings

The Dorothy Hodgkin Fellowship (DHF) scheme was launched to help scientists requiring flexibility in their work patterns to progress towards independent research leadership careers, whether those are early steps soon after doctoral study or transition to a leadership position for those with more experience. For the majority of the scheme's lifetime since 1995, it offered a somewhat shorter period of funding (around five years) than the URF, although the differences in the award package have largely been closed recently. Most of the DHF alumni within this study to date experienced the award when its duration was shorter than the URF, and on average their prior postdoctoral experience was less than for URFs, and their outcomes need to be considered in this context.

The CPT2 surveys have offered a good opportunity to assess outcomes from the scheme as a whole to date (from 113 respondents, while we know that five others progressed to a URF or similar). Overall, the profile of DHF alumni has been very distinct (from URFs), with the response sample being dominantly female (94%). Data was not available to determine the proportion of alumni who declared a disability during the award, but 8% of alumni did so in this recent survey, which is higher than amongst URFs. Interestingly, also, a higher proportion were from outside the UK (45%). 13% of respondents reported that they had undertaken the award on a part-time basis and 17% for part of their award, suggesting that 70% participated full-time, although these proportions appear to be somewhat lower than the working patterns of current DHF awardees. While the respondents might not seem to reflect fully the flexibility of work the scheme aimed to support, the results contrast with the almost entirely full-time nature of URF awards within this study.

The new evidence confirms that most DHF alumni responding to the survey have remained on an academic research trajectory (88%) and are research-active, while most of the rest work in STEM industries/organisations. With three quarters working in the UK, there appears to be a strong retention effect (i.e. this is higher than proportion of respondents of UK nationality, 55%).

Currently, the most common job level is Professor (40% of those in academic careers) with over half having reached at least this level of seniority, demonstrating that alumni have progressed strongly, as only around 15% entered a Professor-level position immediately after their award. 95% of those in academic positions have a permanent job, although for a significant minority that was not achieved immediately after the award. However, together, these results seem to be good evidence that the award has had exactly its intended effect, i.e. of facilitating the first steps towards research leadership.

In terms of other potential metrics of independence, almost all DHF research-active alumni have published a significant paper as a PI, 90% won major research grants, 94% recruited postdoctoral research staff at some point and 91% supervised a doctoral student to completion. When surveyed, two thirds were leading a research group, based on such statistics.

Results here also confirm, more qualitatively, the range of scientific and research leadership contributions that DHF alumni are playing, as the scheme has matured and alumni progress deeply into careers. Their reflections on the impact of the award remain very positive, with great value attributed not only to the time and support to undertake independent research but also the additional confidence and prestige they gained from the award.

5. Sir Henry Dale Fellowship

The Sir Henry Dale Fellowship (SHDF) was launched by the Royal Society and Wellcome Trust in 2012 specifically to support the progression to independent leadership of early-career researchers working on important topics in biomedical fields or public health, essentially subsuming URFs in this area. Between 2012 and 2020, over 200 awards were made, with an average value of just over £1 million each, with as many as 40 per year in some years. The award offered five years of funding with a possible extension of a further three years, i.e. broadly parallel to the structure of the URF at that point. CRAC undertook an early evaluation of the scheme for the funders in 2019, although at that stage very few awardees had reached the end of their funding.

A total of 45 contactable alumni from early SHDF cohorts were included and targeted in theCPT2 survey, of whom 35 provided useable responses. As this response sample was so small, only selected results are presented here and they are for the entire response sample (albeit all completed since 2017 so the most recent groups of URF or DHF alumni would potentially be comparable).

5.1. Current employment

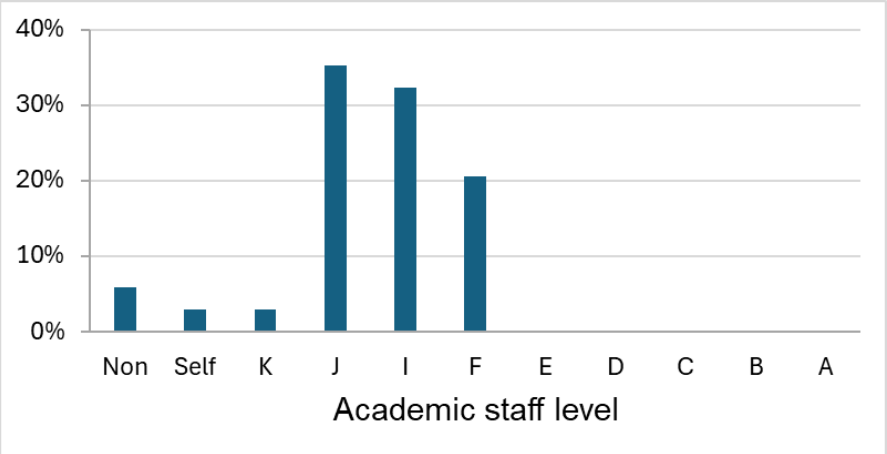
33 of the SHDF alumni respondents were employed, one self-employed and one was not working at the time of the survey. Amongst those who were employed, all but two were working in academia (while both of those were working for pharmaceutical research companies). All but one reported that they were currently research-active.

The location of that current employment was in the UK for 28 of the 32 alumni that were working at the time of survey, with all 17 of the UK nationals working in the UK and 11 of other nationalities, suggesting at least a short-term retention effect of scientists in the UK from the scheme. As this sample of alumni was so small, it is not feasible to present more granular results (i.e. for different nationalities).

For those working in academia/HE in the UK, 21 were still at the institution at which they had held the award (a relatively high proportion, presumably reflecting that all have completed their awards relatively recently). The location profile within the UK was somewhat different from that seen for URF or DHF alumni, with two thirds in London, the East of England and the South East, and only a single respondent based in Scotland (and none in the other nations), although this strongly reflected the institutional locations at which they had held their award.

Figure 5.1 shows that when surveyed, seven or 21% of the SHDF respondents had an academic post at the level of Professor (which was 23% of those in academia), while the majority were at Levels J or I in the UCEA/HESA classification we have utilised throughout this report.

*Figure 5.1 Level of current employment position of SHDF alumni respondents (*N=*34)*



Non	Non-academic occupation
Self	Self-employed
L	Postdoc
K	Research Fellow
J	Senior Lecturer
I	Reader
F	Professor
E	Division leader
D	Department Head
C	Executive Dean
B	Pro Vice-Chancellor
A	Vice-Chancellor

5.2. Impact metrics

Seven of the alumni had changed job since the first position following completion of their award. Analysis of first positions after the award showed that four of the awardees had immediately gained a Professor-level post (12%, or 13% of those in academic posts). While the sample size was small, this appears to be a broadly similar proportion to the result for DHF alumni, but substantially lower than amongst URF alumni from a comparable period. It is possible that such a variance could reflect differing career trajectories of researchers in biomedical sciences compared to those in the broad range of physical and biological sciences and engineering covered by the URF.

Just under three fifths (57%) had obtained a permanent employment contract by or in the year they completed their award, while by the time of the survey this had risen to 66%. Again, this was markedly fewer than amongst URFs in the most recent period covered by the survey but more similar to outcomes for DHF alumni in this respect.

On the other hand, SHDF alumni had achieved some of the other research-related metrics to a similar extent to comparable URF alumni. All but one had published a significant paper as a principal investigator, and all bar one of those had done so by the year they completed their award. All of them had recruited at least one researcher into their research group by the time they completed their award. When surveyed, 88% of the research-active SHDF alumni had at least one postdoctoral research staff member working in their team (and a mean of three such members of staff), while over two thirds of them had at least one researcher at another career stage. Half had at least one technician or professional services staff member in their group.

Similarly, all but one SHDF alumni had supervised a doctoral student to successful completion by the time they completed their award. At the time of survey, 91% of the research-active SHDF alumni had at least one doctoral researcher in the group they led, with a mean of three doctoral researchers each.

On the other hand, a somewhat lower proportion, 71% (compared with 87% of recent URF alumni) had been successful in winning a significant research grant by the end of their award, or in that year, while a total of 80% have done so to date.

Summarising these results in Table 5.1, these metrics seem to suggest that SHDF alumni have not achieved some of the career-related measures to the same extent or as quickly as URF

alumni from a similar period, but they have done so in terms of published outputs and especially recruiting and supervising other researchers. Again, it is possible that these results reflect some sector-level variances in the (average) trajectories of researchers in biomedical sciences compared with those in the broader range of physical and biological sciences and engineering covered by the URF.

Table 5.1 Proportions of SHDF and URF alumni survey respondents achieving measures of establishment of independent research leadership (SHDF alumni respondents: N=*34; URF alumni respondents completing award since 2017:* N=*98)*

	SHDF alumni		**URF alumni since 2017**	
	By year of completion	To date	By year of completion	To date
Obtained permanent position	57%	66%	94%	99%
Obtained professor-level post	13%	23%	74%	78%
Won significant research grant	71%	80%	87%	91%
Published significant paper	97%	100%	96%	97%
Recruited research staff	100%	100%	97%	99%
Supervised doctoral student to completion	100%	100%	98%	99%

5.3. Other contributions

Results from SHDF alumni respondents on the frequency of their public engagement, knowledge exchange and policy-making activities comprised a somewhat different profile, compared with their recent counterparts in the URF and DHF schemes (Table 5.2).

Table 5.2 Frequency of public engagement, knowledge exchange and national-level policy-making activities of recent alumni, by scheme

	SHDF	DHF alumni since 2017	URF alumni since 2017
Public engagement			
> 1 per year	23.5%	68.4%	45.7%
1 per year	70.6%	31.6%	44.7%
Never	5.9%	0%	9.6%
Knowledge exchange			
> 1 per year	32.4%	36.8%	28.7%
1 per year	35.3%	15.8%	29.8%
Never	32.4%	47.4%	41.5%
Policy-making			
> 1 per year	18.2%	15.8%	6.4%
1 per year	3.0%	10.5%	33.0%
Never	78.8%	73.7%	60.6%
N	*33*	*19*	*94*

However, the response samples for the SHDF and DHF schemes were small, and so these variances may not be statistically robust. The results do suggest, though, that the vast majority of SHDF alumni undertook at least some public engagement activities, although with fewer

doing this more than once annually, but a slightly higher proportion were engaged in knowledge exchange or commercialisation activities (which possibly reflects the more immediately applicability of more biomedical research). On the other hand, only about one in ten of the SHDF alumni had been involved in national-level policy-making activity to date.

5.4. Perceptions of scheme impact

The majority of results from SHDF alumni responding to the survey illustrated strong positive perceptions of the impact of the award on their careers, with 97% believing it had made a strong difference to their career path, 86% that the award had made it easier for them to secure permanent employment and 83% that it had facilitated faster progression. Slightly higher proportions (86%) than amongst URF or DHF alumni felt it enhanced the way that senior colleagues perceived them and, similarly, 75% that it had impacted on the level of seniority reached to date.

Their perceptions about the value of the award on a range of aspects of development of research leadership were all very similar to those of recent URF alumni. SHDF alumni rated the award's value in relation to developing leadership capabilities even more highly, including in enabling multi-disciplinary work (83%). On the other hand, only around one in five thought it valuable as an opportunity to commercialise their work (which was a similar result to the other award alumni, albeit more of these alumni felt this was relevant to their work).

There were much more marked differences in responses to questions about the extent of value of different potential benefits of the award towards development of research leadership. SHDF alumni gave somewhat less positive ratings of value in terms of the prestige of having a Royal Society research fellowship (30% very valuable compared with 61% of URF respondents) and the opportunity to interact with FRSs (12% very valuable or valuable, compared with 35% of URFs). This was presumably in part because the SHDF was funded and managed in partnership with Wellcome and some awardees may have felt more connection to Wellcome.

Comments in response to an invitation to summarise the impact of the award were highly positive, suggesting it was transformational for their career (several mentioning that without it they would most likely have moved into industry):

> *"Having the time, resources and freedom to focus on my research allowed me to establish myself within the field. This has helped with subsequent collaborations and continued research, funding applications etc. I was able to establish my lab group and research without having to juggle the demands of a teaching and research contract, which I am now doing as a full academic member of staff. Having a fellowship that enabled my own development through cohort training and events was invaluable to me."*

> *"The main difference was the ability to focus on research and have the freedom to pursue innovative risky ideas which lead to high impact publications. This was the main factor that allowed me to obtain core funded positions thereafter."*

> *"Being awarded the Sir Henry Dale Fellowship was absolutely instrumental in allowing me to keep a career in scientific research and has enabled me to establish an internationally recognised research group which has gone on to secure significant further funding. It was undoubtable a hugely important tipping point in my career."*

"My career probably would have ended if I didn't secure the fellowship when I did. Progression to an independent researcher in my field is almost entirely dependent on securing such a fellowship."

"The SHDF was instrumental for getting my current job, setting up my own lab and develop a network of friends and collaborators. The dual involvement of the WT and the RS made the support and opportunity network unparalleled."

5.5. Scientific and research achievements

In parallel with DHF alumni, around a third of the SHDF alumni responding to the survey listed some kind of recognition, including seven who cited specific prizes, in addition to those who had gone on to win further research funder/funding awards.

Again, around one in five SHDF alumni in the survey listed that they had filed or were in the process of filing a patent or licensing technology to industry for commercialisation. Two listed ongoing spin-out ventures.

"We are in the process of patenting an anti-cancer immunotherapeutic strategy. I hope that this will lead to a future clinical trial, and a benefit to cancer patients."

"We are at the phase where we have discovered a novel microbial metabolite that enhances chemotherapy and have generated a more potent molecule through organic chemistry. The patenting and commercialisation are dependent on additional work to be done in animals."

"[…] my first patent, which describes a new technology to remove proteins from the surface of cells. […] the technology is already attracting interest from potential licensees. I am proud of this work as it neatly exemplifies the power of combining insights in molecular biochemistry and molecular virology, core interests of my lab."

"To come this year with our first spinout. Building on what we have learnt from our collaboration with […], we will take our therapeutics and build a company on this IP."

The other personal achievements of which SHDF were particularly proud, beyond their published scientific research outputs, encompassed a similar range to those recorded by alumni of the other award schemes. Supporting the next generation of researchers, the career position they had now achieved, new collaborations they had initiated and new grant funding they had obtained were all sources of pride for at least five alumni (out of the 20 citing personal achievements). In addition, there were several instances of pride in institutional or facility leadership, and individually other achievements included peer recognition, introducing a more family-friendly working culture, and public engagement and policy activities. As for recent DHF alumni, there was also evidence of pride in resilience, which may partly reflect that awardees had to navigate restrictions due to the Covid-19 pandemic.

"I have been asked to give ~25 invited talks in recent years which reflects my position as an internationally recognized leader in the field of MRI technique innovation which was only made possible because of the award of the Sir Henry Dale Fellowship."

"Vaccine and diagnostic development of a zoonotic pathogen. My research is blue-skies evolutionary biology so contributing to applied research is novel and rewarding."

"Working closely with WHO as a member of […] Technical Advisory Group and a key expert for [its] SARS-CoV-2 guidelines group for genomic sequencing."

"My first postdoc winning Young Investigator of the Year for the largest society in my field. This provided validation for the hard work we have put in."

"Public engagement work around COVID vaccination, fertility and pregnancy, as recognised by the British Society for Immunology."

"I am proud of having survived, staying in science and having a flourishing scientific career now."

5.6. Summary of evaluative findings

For the period of its operation, the Sir Henry Dale Fellowship (SHDF) was positioned specifically to support the progression to independent leadership of early-career researchers working on important topics in biomedical fields or public health, i.e. similar to the URF scheme but targeted in these areas. The CPT2 survey results reported here provide the first substantive indications of early post-award outcomes, as very few awardees had reached completion by the time of the 2019 scheme evaluation (unpublished).

While the sample of SHDF alumni in the new survey was of very modest size – only 35 respondents – these results show that almost all were in academic research positions in the UK, although for most of these alumni this was within five years of award completion. 13% of those gained a Professor-level post immediately after their Fellowship, and 23% had done so by the time of the survey. Just under three fifths (57%) obtained permanent employment by or in the year they completed their award and this had risen to 66% when surveyed. Broadly, these appear to be roughly similar proportions to those seen for comparable DHF alumni, but not as strong as for URF alumni from a comparable period. 71% had won a significant research grant by the end of their award, and 80% had done so when surveyed.

Results in relation to other potential metrics were more similar to those observed for URF alumni, with almost all publishing a significant paper as a principal investigator and recruiting at least one researcher into their research group by award completion. When surveyed, around 90% of the research-active SHDF alumni had at least one doctoral student and a postdoctoral researcher working for them (with a mean of three of each), over two thirds supervised at least one researcher at a more senior career stage and half had technician/s or other staff too; thus, most were leading a research group. Taken together, these metrics seem to suggest SHDF alumni are achieving many of the career-related and leadership measures intended but not quite to the same extent or as quickly as contemporary URF alumni.

There is evidence that some are undertaking path-finding research and that many are beginning to make broader contributions to science and research, including a substantial minority developing commercialisable outputs, and that they are becoming recognised for these activities. Their perceptions of the high value of the award in their progression are strong, similar to those of comparable URF alumni, especially in development of their leadership capabilities, although with weaker value attributed to potential benefits based on engagement with the Royal Society (understandable given the award was jointly with Wellcome).

It will be interesting to observe results from future Career Pathway Tracker surveys, as by the next wave the number of SHDF alumni will have grown substantially and it should be possible to consolidate these emerging positive results.

Part C – Themes of interest

6. Retention and mobility

An important finding of the first Career Pathway Tracker report was that high proportions of URF and DHF alumni of UK nationality remained working in the UK after their award, and around two thirds of those of other nationalities. In time, a small but increasing proportion of alumni did move abroad, both UK nationals and others. However, as a snapshot at that time, the total number of alumni working in the UK was larger than the total number of alumni who were UK nationals, suggesting that the schemes were contributing positively to the total research capacity in the UK (i.e. the effect of the awards in bringing international researchers to the UK and retaining them was greater than any 'brain drain' of alumni subsequently).

As retention of top researchers in the UK is an aim of these awards, it is timely to update these statistics on retention and international mobility, although it must be acknowledged that recent mobility may have been influenced by both the UK leaving the EU and the COVID-19 pandemic, one way or another. Table 6.1 shows that, for all three schemes, most alumni were working in the UK at the time of the survey, whether UK nationals or not (although the number of individuals in some groupings were small). Further analysis revealed that amongst URF alumni, slightly higher proportions of alumni in Royal Society A-side subjects[9] (82%) were working in the UK than of B-side (77%) overall, and similarly amongst those of UK nationality.

Table 6.1 Current location of employed alumni, for UK and non-UK nationals[10]

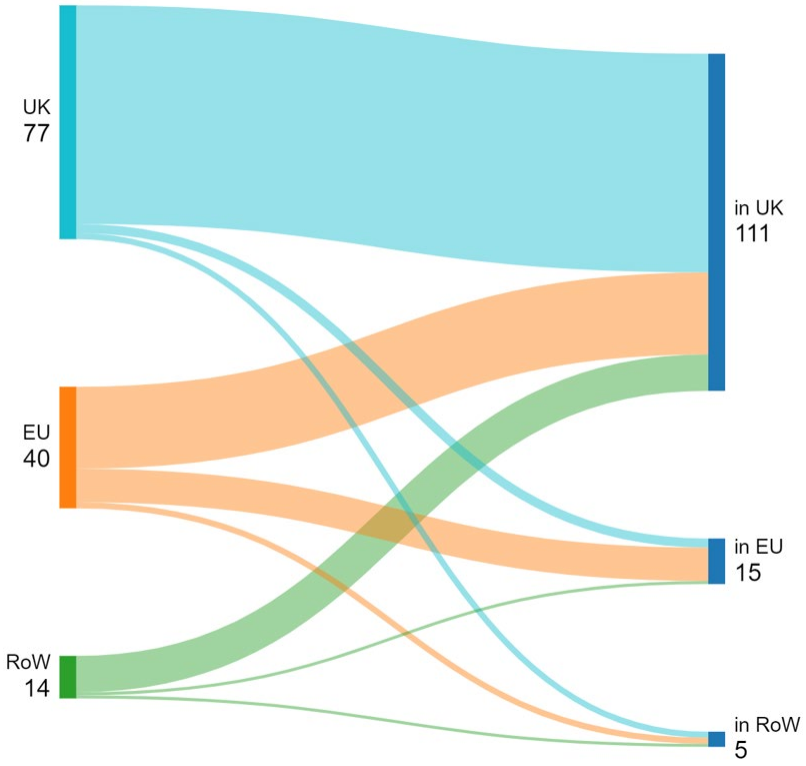
	URF			DHF			SHDF		
Nationality	All	UK	Non-UK	All	UK	Non-UK	All	UK	Non-UK
Location									
UK	80%	85%	57%	72%	83%	58%	88%	100%	71%
EU	9%	4%	27%	15%	7%	24%	6%	0%	14%
RoW	11%	11%	16%	13%	10%	16%	6%	0%	14%
N	*578*	*432*	*111*	*109*	*54*	*45*	*32*	*17*	*14*

There was some evidence of migration away from the UK as post-award careers progressed. Amongst URF alumni, for example, 88% of alumni since 2017 (and 93% of UK nationals in this group) were working in the UK when surveyed, which was higher than the 80% (and 85%, respectively) recorded for all URF alumni in this survey. On the other hand, amongst DHF alumni, the proportion amongst the most recent alumni working in the UK was 74%, the same percentage as for all alumni. This partly reflects that the majority of recent DHF alumni responding to the survey have not been UK nationals. In contrast, all but five of the SHDF alumni to date were working in the UK when surveyed, including most of the non-UK nationals.

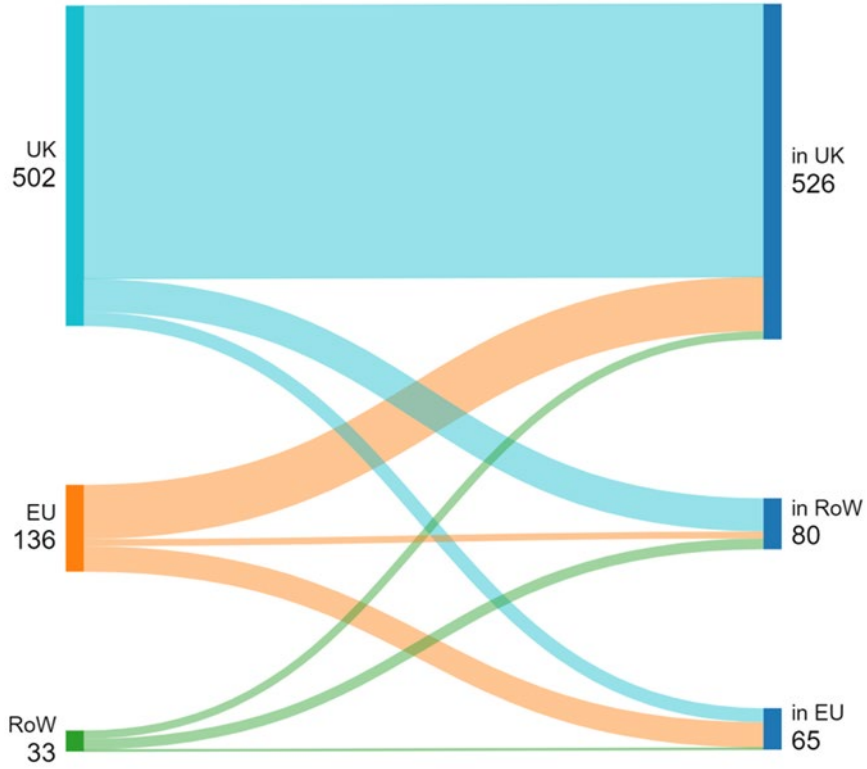
[9] Royal Society 'A-side' subjects are broadly the physical sciences, and biological subjects the 'B-side'
[10] Note that the columns headed 'All' contain some respondents who did not report their nationality

Figure 6.1 Sankey diagrams showing nationality and employment location for alumni of all three schemes combined (a) completing awards since 2017, and (b) overall to date; with nationality as left-hand axis and location of employment as right-hand axis

(a)



(b)



Considering the three early-career schemes together, Figure 6.1(a) illustrates the strong retention effect of these schemes within the first five years since completion of award, with 111 of the 131 alumni (85%) completing awards since 2017 remaining in the UK at the time of survey, far higher than the 77 UK nationals amongst these alumni. In comparison, Figure 6.1(b) represents the cumulative overall picture for all three schemes together, to date, again showing net retention but to a lesser degree than for recent alumni (with 526 alumni out of 671 (78%) working in the UK, higher than the proportion of UK nationals in the schemes (75%).

6.1. Periods of international mobility

Some revisions to questions were made for the CPT2 surveys, in an attempt to shed more light on both international and sectoral mobility. Analysis of periods of mobility to other countries is presented here only for UK nationals. On this basis, 56% of all UK alumni in the survey reported that they had undertaken a significant period of work outside the UK, which we had indicated was three months or longer (Table 6.2). In more detail, 44% of all UK alumni had spent such time outside the UK prior to their award, with a mean period abroad of about two years. One in five (21%) had spent time working abroad during their award (for an average of nine months), and just over one quarter (27%) had worked for a period abroad since completing their award (with a mean period of four years).

Brief analysis of results for those of other nationalities suggested that the extent of mobility during the award was similar to those of UK nationality.

When this analysis was confined only to those of UK nationality and now working in the UK, a similar proportion overall (54%) had spent some time abroad, although a slightly lower proportion had worked abroad since their award (23%) than overall, reflecting that some of those reporting time abroad included those who were abroad when surveyed. This finding is to some extent reassuring, i.e. that mobility is not being driven by those who ultimately will leave the UK, but is almost as common for those remaining in the UK long-term.

Table 6.2 Experiences of significant periods of work outside the UK, amongst UK nationals (survey respondents)

	N	Total mobility	Mobility prior to award	Mobility during award	Mobility since completion
All alumni	553	56%	44%	21%	28%
All URF	467	57%	45%	23%	30%
All DHF	56	46%	36%	9%	21%
URFs completing before 2008	280	56%	41%	20%	33%
URFs completing 2008 onward	188	58%	48%	20%	17%
Male URF	367	56%	45%	28%	31%
Female URF	93	53%	46%	11%	28%

Analysing these results for various sub-populations did reveal some differences. For example, somewhat higher proportions of all URF alumni (57%) than DHF alumni (46%) had experienced some international mobility, at all three stages considered. The particularly low proportion of DHF alumni working for a period abroad during the award (9%) was perhaps not surprising given that many awardees had this specific fellowship in order to accommodate

caring responsibilities (or periods of sick leave), and/or more of them undertook it part-time, both of which may have reduced their ability to travel during the award.

Amongst URF alumni, more of the respondents completing awards in 2008 or later tended to have spent time abroad prior to their award (48%) compared with awardees completing before that time (41%), although the proportions who were mobile during award were the same. This possibly reflects that with time there has been a shift towards more experienced candidates winning URF awards, who have had more years of postdoctoral experience and presumably on average spent more time abroad during it.

By gender, the proportions of URF alumni who experiencing mobility before the award and since the award were roughly similar for men and women, but noticeably fewer of the women (11%) went abroad during the award itself (compared with 28% of the men).

URF alumni respondents who had spent a period of more than a year working abroad (*N*=102) were asked to state the country/ies involved. This showed that the most common destination for these longer-term periods of work was the USA, experienced by four times as many of these UK alumni as any other country (followed by, respectively, Switzerland, Germany, Australia and Sweden).

6.2. Intersectoral mobility

One of the aspects of the research and development eco-system in which there is currently much interest is mobility between academia and other sectors (and/or the 'porosity' within the system that enables such movement to occur). Given the rarity of studies that systematically track the long-term careers of researchers, this study has some potential to provide insights into the sectoral mobility of researchers through their careers. Based on a similar question to that posed about international mobility, respondents were asked whether they had spent significant periods working in a sector other than academia, and the extent of such work. In this case, it was thought that potentially interesting results could emerge from those currently working in academia, to understand whether they had spent periods of time working in other sectors during their career, and from those who 'left' academia to work in another sector long-term. In the CPT1 study it was shown that the proportion of alumni working outside academia was higher amongst earlier alumni than recent alumni, as across the course of careers more of them shifted to other sectors. Analysis was restricted to those currently in employment, as sector knowledge about those who had retired or were not working was not available in the survey. Table 6.3 summarises results from some of the key groups of interest, noting that some groups were small. There were insufficient SHDF alumni currently working outside academia and answering these questions to be included in this analysis.

Overall, 14% of alumni (now in employment) had had some experience of working in another sector, half of whom did so prior to their award. However, inspection of 'after completion' responses revealed that more than half were from alumni who had left academia and remained working in another sector until surveyed, which could be decades in some cases. This led to results for mean duration in another sector being somewhat meaningless. A more useful analysis emerged by considering those now in academia (or not) separately. Accordingly, 10% of those now in academia had spent some time in another sector, most commonly before their award. Very few did so during the award itself, and 4% had worked in another sector since their award. Interestingly, more of those who had 'left' academia permanently had also spent time in another sector before and during their award, than those who were academics now.

Table 6.3 Experiences of significant periods of work in sectors other than academia by survey respondents currently in employment (with mean length of time, where known)

	N	Total mobility	Mobility prior to award	Mobility during award	Mobility since completion
All alumni	725	14%	7% (2 yrs)	2% (8 mths)	9% *
All currently in academia	678	10%	6% (2.5 yrs)	1% (8 mths)	4% (4 years)
All currently in another sector	48	100%	24% (2 yrs)	10% (10 mths)	100% (14 yrs)
URF currently in academia	547	9%	5% (2.5 yrs)	1% (8 mths)	4% (4 yrs)
URF currently in another sector	30	100%	25% (2 yrs)	10% (8 mths)	100% (13 yrs)
DHF currently in academia	92	12%	9% (3 yrs)	<1%	2% *
DHF currently in another sector	14	100%	21% (6 yrs)	0%	100% (13 yrs)
SHD currently in academia**	29	10%	10% (2.5 yrs)	0%	0%

*Results not meaningful because mean based on non-comparable types of duration

** SHDF alumni outside academia too few for analysis separately

Similar analysis for URF alumni specifically produced very similar results to those above, due to the large proportion of all alumni in this scheme, and confirmed a correlation between spending time in another sector prior to award and subsequent long-term work in that sector. Results for DHF alumni suggested that those now in academia had been slightly more mobile prior to their award than URFs, but less so during or after their award. We noted in this study and in the CPT1 study that a slightly higher proportion of DHF alumni than URFs currently work outside academia. The results for the small group of SHDF alumni were similar to those in the other schemes (especially DHFs) although little time has elapsed for any experiences of mobility since their completion of their award.

Analysis by gender for URFs did not suggest there was a substantive difference in the extent of mobility, but even fewer of the women spent time in another sector during their award. By broad subject area, sectoral mobility was somewhat more common amongst URFs in A-side subjects (physical sciences etc: 11% of those now in academia) than B-side subjects (biosciences etc: 8%), both prior to and after the award.

7. Insights into research leadership

In previous chapters, we presented results for each award scheme about the extent to which alumni have recruited research staff and supervised doctoral students, and when they started to do this, as these have been considered amongst the measures that signal establishment of an independent research leadership role. Here we pull these results into a more inclusive picture and offer some other insights into the current and cumulative extent of research leadership undertaken by the alumni.

7.1. Training the next generation of scientists

Considering the extent to which they lead research groups, at the point of survey, three quarters (75%) of currently research-active URF alumni were managing at least one postdoctoral research staff member, and a similar proportion (77%) of URF alumni completing their award in 2018 or later. Half were managing one or more researchers at another level and 38% at least one technical or professional staff member. The respective proportions URF alumni who completed their award since 2017 were similar for doctoral students and postdoctoral researchers, but somewhat lower for other types of staff (Table 7.1).

Analysing the URF data in more detail revealed that somewhat higher proportions of URF respondents in B-side subjects (biological and related sciences, broadly) appeared to be managing researchers than their A-side counterparts (physical sciences and engineering subjects), in all categories but especially in relation to professional/technical staff.

Slightly fewer DHF alumni were managing at least one postdoctoral researcher (67%) but somewhat higher proportions other researchers (61%) or professional staff (50%). Very high proportions of SHDF alumni were supervising doctoral researchers (94%) and postdoctoral researchers (88%), and roughly as many as DHF alumni were managing other types of staff, i.e. higher than the case for recent URFs.

Numerically, between them, at the time of survey, the alumni responding to the survey were collectively managing almost 1600 postdoctoral research staff (which is potentially around 2% of all the UK's STEM postdoctoral staff), over 900 other researchers and over 550 technicians or other professional staff (Table 7.1).

The proportions of research-active alumni in all of the schemes (and key segments of URF alumni) responding to the survey currently supervising at least one doctoral student were consistently just over 90%, which together comprised over 2400 doctoral researchers (equivalent to over 3% of all STEM doctoral students in the UK).

Collectively these data confirm that research-active scheme alumni are playing a substantial role in leading and training other researchers, and there is some evidence for alumni in biological and biomedical subjects having somewhat larger groups (and especially having professional /technical staff), which may reflect that more of those alumni are undertaking lab-based science which involves more people.

Table 7.1 Number of researchers currently managed or supervised by research-active alumni respondents. Percentages are proportions of research-active alumni managing or supervising at least one such researcher

	N	Doctoral students	Postdoctoral research staff	Other levels of researcher	Technicians or professional staff
All URF	*524*	2030 (91%)	1315 (75%)	725 (50%)	450 (38%)
URF alumni 2018 onwards	*99*	385 (91%)	215 (77%)	120 (39%)	55 (28%)
A-side URF	*315*	1405 (92%)	755 (72%)	490 (48%)	240 (30%)
B-side URF	*193*	590 (90%)	530 (79%)	230 (53%)	205 (51%)
All DHF	*93*	305 (91%)	160 (67%)	160 (61%)	85 (50%)
All SHDF	*34*	85 (94%)	90 (88%)	25 (59%)	20 (53%)
Total	*649*	2425 (91%)	1570 (74%)	915 (51%)	550 (40%)

The survey also sought data from respondents about the total number of research staff they had managed during their career to date. This produced a total figure of nearly 7400 postdoctoral researchers (Table 7.2), while they had supervised over 9600 doctoral students between them.[11] Cumulative figures for other levels of researcher or professional/technical staff were not collected. It should also be noted that these totals were purely for survey respondents, not for all current alumni, so the total number from all scheme alumni would be higher still.

Table 7.2 Cumulative number of researchers managed and doctoral students successfully supervised to completion by alumni respondents to date

	N	Doctoral students	Postdoctoral research staff
URFs	*589*	8835	6690
DHFs	*102*	720	560
SHDFs	*35*	110	140
Total	*726*	9665	7390

Altogether, we regard these as very significant contributions to the UK's research capacity (and it would be fascinating were it possible to track the careers and contributions that these researchers have gone on to make, although this is clearly outside the scope of this study).

7.2. International collaborations

Another aspect of research leadership that has been of interest to the Royal Society is international collaborations. In the recent Career Pathway Tracker (CPT2) surveys the question on this was revised to make it clearer, as there was some evidence of differing interpretations by respondents in the CPT1 survey analysis. The new data again showed the widespread extent of collaborations, with 82% of all research-active alumni reporting at least one current international collaboration. The extent was very slightly higher amongst URF

[11] These totals underestimate the true amount because numbers over 50 were reported as 'over 50' and calculated in the total as 50

alumni than DHF or SHF, although with very high proportions of recent alumni in the DHF scheme reporting that they had at least one collaboration ongoing.

The mean number of such collaborations in which they were involved was between two and three for almost all sub-groups considered, and slightly higher for URFs (2.8) than for alumni of the other schemes (2.0-2.2). These data are summarised in Table 7.3.

Table 7.3 Proportion of research-active alumni respondents with a current international collaboration (N is number of research-active alumni)

	N	Proportion with at least one collaboration	Mean number of collaborations
All alumni	*650*	82%	2.7
All URF alumni	*526*	83%	2.8
URF alumni since 2017	*93*	84%	3.0
All DHF alumni	*92*	80%	2.2
DHF alumni since 2017	*19*	95%	2.7
SHDF alumni	*32*	75%	2.0

8. Flexible working and career breaks

Another topic covered more robustly in the CPT2 surveys, possible through the revision of certain questions, was the extent to which alumni had taken breaks within their career for personal reasons, including during their award, and/or undertaken their award on a flexible basis.

Taking the latter issue first, as noted in chapter 3, the overwhelming majority of URF alumni in the period covered by this study undertook their award on a full-time basis, although this has begun to change slightly. Under 1% of URFs completed by 1998 involved part-time working, while this was 3% for completions in the period 1998-2007, just over 4% for later completions since then and also 4% of current awards (from grant system data). Despite its inherent flexibility, 70% of DHF alumni had worked full-time through their award, with 13% wholly part-time and 17% with discrete periods of partial working. All but one of the SHDF alumni had worked full-time throughout – with one shifting to part-time for two discrete periods of time.

Analysis of results from alumni about whether they had taken any breaks in their career for personal reasons revealed a complex picture but some evidence for a changing picture. Data on type, instances and durations of breaks were investigated, isolating breaks for maternity/paternity leave, for caring responsibilities (including looking after children), for ill-health and for other reasons, separately. This revealed that the majority (59%) of URF alumni had not taken any kind of break at any point in their research career, while this was lower (37%) amongst URF alumni since 2017 (i.e. nearly two thirds had taken some kind of break for personal reasons up that point, and the position for SHDF alumni was broadly similar, bearing in mind that the number of instances was very low). In contrast, 85% of DHF alumni had experienced some kind of career break for personal reasons (Table 8.1) at some point prior to the survey.

Table 8.1 Proportions of alumni responding to survey reporting some kind of career break for personal reasons, by scheme

	At least one career break		No career break	
	%	*N (alumni)*	%	*N (alumni)*
All URF alumni	41%	*246*	59%	*361*
URF alumni since 2017	63%	*61*	37%	*36*
DHF alumni	85%	*98*	15%	*17*
SHDF alumni	66%	*23*	34%	*12*

Detailed questions about when these breaks had taken place, and for how long a duration, were introduced in the CPT2 survey, for each type of break. Overall, this revealed that breaks for parental or caring purposes had been taken more commonly during awards than either beforehand or afterwards, whereas breaks for ill health were more common after an award (as might be expected, as that period was much the longest, for many alumni). This could be interpreted to mean that these awards offer more flexibility than employment circumstances beforehand (i.e. postdoctoral research contract positions) or afterwards (as established researchers in academia or elsewhere). Alternatively, it could just reflect that becoming a

parent and needing time to look after young children, especially, very often occurred during the same life stage as having an early-career award.

In more detail, the results showed that one third of all URF alumni respondents have taken at least one break for maternity/paternity at some point, including 22% during their award, and this was the case for over 40% of alumni completing their award since 2017 (Table 8.2). This was more common for women URFs (45% during award, overall, including 18% more than once) than men (14%). Although the extent of evidence was very sparse, analysis of breaks amongst recent alumni by gender suggested these proportions were converging. On the other hand, women URF alumni have tended to take a longer maternity break during their award (a mean of 9 months) compared with comparable paternity breaks by men (2 months), presumably partly reflecting that during much of the lifetime of the scheme paternity leave rights were very limited.

In comparison, three quarters of DHF alumni respondents had taken maternity/paternity leave at some point, including 38% during their award (10% doing so more than once), higher than the proportion amongst all URFs. This almost certainly reflects in part the different gender balances of these two schemes to date. Interestingly, however, almost 40% of DHF alumni had taken a period of maternity/paternity leave prior to their award, which was much higher than for URFs (only 5% overall, and 11% of women URFs). This difference was to be expected considering eligibility for the award/s and seems to align with the aim of the DHF award, i.e. being positioned for those who require support because of various personal responsibilities that restrict the time they can dedicate to research, both before and/or during an award. (Again, however, this difference pre-award will also reflect that during the years studied a large majority of DHF awardees were women.)

There was also some evidence to suggest that the proportion of recent URF alumni taking maternity/paternity leave prior to their award was higher than overall, with a particular relative increase amongst men (although the sub-samples involved were small when split by gender). Results for SHDF alumni appeared to be broadly similar to those for recent URF alumni.

Table 8.2 Proportions of alumni in survey reported maternity/paternity career breaks and total duration of such breaks (in months)

		Pre-award		During award		Since award	
	*N***	%	Duration	%	Duration	%	Duration
DHF	*106*	39%	8	38%	8	28%	9
SHDF	*34*	21%	12	37%	8	0%	-
All URF	*607*	5%	7	22%	5	14%	5
Recent URF*	*97*	15%	3	41%	3	8%	3
URF (men)	*445*	3%	3	14%	2	14%	3
URF (women)	*122*	11%	15	45%	9	19%	10

*Recent URF refers to alumni completing awards since 2017

***N* refers to total population for each award; duration figures are cumulative (i.e. can include multiple instances)

In contrast, far fewer alumni took career breaks in order to care for children or others (Table 8.3). In total, about one in five DHF alumni had done this at some point, but only around 5% of all URF alumni (similar to the proportions recorded in the previous report). However, when the timing of this type of leave was identified, only around 8% of DHF alumni had taken it during

their award and 7% before their award, although these were higher than amongst URF alumni (1%, and under 1%, respectively). As for parental leave, occurrences of this type of leave were somewhat more common amongst recent URF alumni than overall, although the rarity of instances made such response samples very small and potentially unreliable. Another thing that stood out in these results was the rarity of leave for caring responsibilities in the careers of these scientists after their award, especially for URFs.

Results for SHDF alumni are not reported here because so few have taken this type of leave.

Table 8.3 Proportions of alumni in survey reported career breaks for caring responsibilities and total duration of such breaks (in months)

		Pre-award		During award		Since award	
	N	%	Duration**	%	Duration	%	Duration
DHF	*106*	7%	30	8%	7	7%	29
All URF	*607*	<1%	-	1%	12	3%	10
Recent URF*	*97*	4%	-	2%	-	1%	-
URF (men)	*445*	<1%	-	<1%	-	2%	10
URF (women)	*122*	<1%	-	2%	-	6%	11

*Recent URF refers to alumni completing awards since 2017
**Mean durations are not stated where instances are lower than five

Only around one in ten alumni (across all the schemes) had ever taken a career break due to ill health, with most instances of this type of personal leave taking place during the post-award stage of their careers. Such breaks were taken by around 8% of URF alumni in total but 14% of DHF alumni, mostly for a few months but in a few cases for a year in duration. They were relatively rare during an award (3% of URFs, 5% of DHFs) or prior to award (1% of URFs, 4% of DHFs). Based on the sparse evidence available (i.e. due to the low level of total instances), breaks for illness during an award appeared to be more common amongst recent URF alumni, affecting up to one in ten awardees.

In summary, overall, the frequency of career breaks for personal reasons such as childbirth or caring responsibilities has been higher in the DHF scheme than the URF scheme, both during and particularly prior to the award. Its frequency amongst URF alumni at these stages appears to have risen relatively recently, with maternity/paternity breaks during award approaching the level seen amongst DHF awardees. In addition, much higher proportions of DHF alumni have used their award to support flexible working than have URF alumni, but the previously very low extent of this amongst URF alumni does appear to have been rising somewhat lately. It should, however, be remembered that these data are entirely retrospective and the position for current awardees may have evolved further.

9. Retirement

The two Career Pathway Tracker surveys to date have not been designed to obtain insights into the current activities of alumni once they have retired from work. The questions that have been put to them have elicited information about certain activities during their career, some cumulative career data and their retrospective perceptions about the impact and benefits of their award/s. In the consents section of the survey questionnaire, all alumni are invited to signal whether they would like to continue to participate in this study and consent to their data being held, and a small proportion elect not to take part in future waves of the study.

In the recent survey, 50 of the responding alumni (exclusively URFs) indicated that they had retired, while none had done so in the first survey. Presumably, with the passage of time, more of the alumni will progress into retirement, while at the same time newly emerging alumni will enter the scope of the study.

However, only one in five of these retired alumni requested to leave the study, suggesting that the majority could be prepared to continue to contribute in some way, either providing further reflections or perhaps new types of data about their further contributions once formally retired from employment.

Although questions about their ongoing activities were not posed, a number of the retired URF alumni indicated that they continued to be active in various ways. Six mentioned that they were Emeritus Professors.

> *"Since taking full retirement in 2018 I have written 4 books on materials science, one of which was written for high school students to introduce them to materials science."*
>
> *I am retired but still write and I am completing previous experimental work in collaboration with a colleague. I have an Emeritus Professorship and continue to license biological materials, to work with a medical charity and to be involved in science education. These are all things that I established as a URF."*
>
> *"I continue to collaborate with colleagues in research on my field, both at home and abroad, including contributions to grant applications, but no longer have formal collaborations with international collaborators."*
>
> *"Retired (2016), and no longer now seriously research-active, but still teaching several hours each week."*

If/when future waves of the Career Pathway Tracker survey are implemented, it could be valuable to insert a few questions specifically for those who have retired formally from employment, to understand their ongoing contributions and/or the proportion who step down completely at the point of retirement.

Part D - Overall findings

10. Evaluative findings and key topics of interest

10.1. Scheme impacts

At the end of chapters 3, 4 and 5, we have provided summaries of our findings in relation to the impacts of the three early-career schemes, respectively, so far as can be identified through the lens of a survey of scheme alumni. In short, the surveys this year – assuming that they are representative of the alumni targeted – provide further evidence confirming that the vast majority of URF alumni have achieved the measures identified signalling establishment of independent research leadership, while a small proportion switch to other career paths where most make other contributions to science and society (about whose progression and activities we have less systematic insight). This essentially positive finding is supported by extensive qualitative information about the research advances, achievements and other contributions of these scientists, many of which have earned external or disciplinary recognition.

As the DHF scheme matures, there is increasing evidence not only that DHF alumni have been achieving the "first steps towards independent research careers" that the scheme set out to support, but that many have progressed fully to positions of research leadership. Nearly 90% of alumni responding to the survey have remained on an academic research trajectory and were research-active, while almost all the rest work in STEM industries/organisations, suggesting that the flexible support offered them through the award has facilitated such progression and retention within science in the UK. Just over half, to date, of those on an academic career path have reached the level of Professor or higher and 95% have a permanent position. Almost all DHF research-active alumni have published a significant paper as a PI, 90% have won major research grants and over 90% recruited research staff and supervised a doctoral student; at the point of survey two thirds were leading a research group.

Meanwhile, a modest number of SHDF alumni (35 respondents) represented entry of this scheme into the scope of this project, many of whom reported research-related metrics very similar to those of their recent URF counterparts. Almost 90% had transitioned to academic research posts in the UK, were leading research groups and undertaking significant scientific research, although fewer of them had secured some of the intended career measures such as a permanent contract and markedly fewer had gained a Professor-level post at the time of survey, compared with URF alumni from a similar period. It is unclear whether this less rapid achievement in terms of career progression reflects different trajectories within their disciplines, compared with those for URFs, or some other factor. This can be investigated further in future surveys, when more SHDF alumni have entered the scope of tracking activity.

Overall, however, there is an array of evidence that all three of these early-career schemes are delivering either the long-term impacts desired or shorter-term outcomes that align with achievement of those impacts in the longer term.

10.2. International mobility, collaborations and retention

New insights have been gained into the international mobility of researchers who were funded through these Royal Society early-career schemes. As many as half of URF alumni respondents reported that they had spent some time working overseas, which was most commonly during the postdoctoral stage (i.e. prior to their award), with some evidence that this

could be more common still amongst the most recent alumni. Up to one fifth had spent at least a few months abroad during their award itself.

During their careers post-award, over 80% of all alumni in the survey reported at least one current international collaboration (and a mean of just over two such collaborations each). There was some evidence to suggest this was somewhat higher for URF alumni, than the other schemes, and also higher amongst recent cohorts of alumni than overall.

What might be termed career mobility – long-term or permanent migration – was explored in relation to the potential retention effect of these awards. There was clear evidence that the schemes retain some UK researchers in the country, who would otherwise move abroad, and that they attract international researchers to enter the UK and work here for substantive periods. This net positive effect is strong initially (for at least 10 years post-award) but eventually dissipates as many international scientists ultimately return home or move to third countries and a minority of UK scientists emigrate in mid- or late-career. Nonetheless, for the typical awardee, there appears on average to be a net positive retention effect for 20-25 years of their career, which is presumably when they are at their most productive in research.

10.3. Intersectoral mobility

Compared with international mobility, experiences of work within other sectors appear to be far less common, when considered for those in academic careers. Around 10% of those now in academic positions report that they have spent at least a few months working in another industrial sector at some point, which was broadly similar for all schemes, with over half of those experiences occurring prior to the award. Of course, some research disciplines are much more relevant to industry than others, and these are overall observations aggregated across alumni with awards across the RS remit of disciplines. Instances of time spent in another sector during an award were generally very rare.

Interestingly, there was a correlation between spending time in industry prior to or during an award and having made a career shift to industry after the award (i.e. working in another sector when surveyed). Time spent in industry at those early stages was far more common amongst those now working in other sectors, albeit the sample size for the latter was very small.

Overall, the proportions of alumni within the survey currently working in sectors other than academia/HE are very low (4% of URFs, 6% of SHDFs and around 10% of DHFs). However, we suspect that the two CPT surveys to date have under-represented alumni working in other sectors, due to difficulty in retaining engagement with them once they left academia. A more complete picture of career pathways, and potentially also of the extent of intersectoral mobility or porosity in such careers, may require alternative research approaches.

10.4. Training the next generation of researchers

The most common theme arising from analysis of open-ended responses from URF and DHF scheme alumni highlighting career achievements of which they are most proud was their role in supporting and training other researchers. Most specifically they referred to doctoral students they had supervised and, especially, postdoctoral staff they had taken on and who had then progressed into independent researchers themselves. The survey also produced quantitative evidence of the extent to which these alumni lead research groups – currently at least three quarters of research-active URF alumni, two thirds of DHF alumni and nine out of

ten SHDF alumni who responded to the survey. Higher proportions were supervising doctoral researchers.

Cumulatively, these alumni responding to the survey were currently managing almost 1600 postdoctoral research staff (around 2% of all UK STEM postdoctoral staff), over 900 other researchers and over 550 technicians or other professional staff, and supervising over 2400 doctoral researchers (over 3% of all STEM doctoral students in the UK). For reference, the alumni comprise perhaps 1% of academic staff in the UK in STEM subjects.

Respondents were asked to report how many such researchers they had recruited and doctoral students they had supervised during their career to date. This produced total figures of over 6700 postdoctoral researchers recruited/managed and nearly 10,700 doctoral students supervised. As these figures are derived only from survey respondents, cumulative figures for all current alumni in the schemes would be higher still (by perhaps around one third).

These are very significant contributions to development of the UK's research capacity. Understanding the gamut of scientific, economic or societal achievements that all these emerging scientific researchers have made or will go on to make, subsequent to being recruited or trained by scheme alumni, is sadly beyond the scope of this study.

10.5. Career breaks and scheme flexibility

The overwhelming majority of URF and SHDF alumni in this study undertook their award on a full-time basis although this has begun to change slightly, with 4% of URF alumni respondents since 2017 undertaking their award through part-time work. In contrast, 30% of DHF alumni worked part-time either throughout or for part of their award. Data on current award-holding shows a difference between schemes, albeit of somewhat lower magnitude. On this basis, while the gap between the schemes (in terms of proportion working part-time) is closing somewhat, it seems unlikely that these proportions will have converged sufficiently for the DHF scheme no longer to be necessary (i.e. providing a 'more flexible' alternative to the URF) in the near future.

The survey investigated career breaks in some detail. Overall, career breaks for personal reasons such as childbirth or caring responsibilities have been becoming more common, although understandably have been more commonplace during the careers of DHF alumni (85% of whom have taken some kind of break at some career stage to date) than the others (41% of URFs, but 63% of recent URFs). Detailed questions revealed that breaks for parental or caring purposes were more common during awards than either beforehand or afterwards, whereas breaks for ill health were more common subsequently. This is likely to reflect both the flexibility available in these award schemes but also the life stages at which awards tend to occur.

What is perhaps most important is the increasing demand for and instances of such breaks, with some evidence of a particular relative increase amongst men, reinforcing the need for scheme eligibility criteria to be able to take account of such contextual factors but also for award benefits to be available flexibly.

10.6. Future considerations for the Career Pathway Tracker

The research activity undertaken for this second report in the Career Pathway Tracker project confirms that ongoing engagement with alumni of these schemes is practicable, which can to some extent deliver a longitudinal study. High response rates to our surveys have continued,

which seem to reflect willingness of the alumni to continue to engage and provide information relating to their career progression and achievements (and the impact of these awards in obtaining them), when appropriately invited to do so. That said, the response rates amongst recent alumni are somewhat weaker, albeit much higher than achieved in many social or economic studies. The survey approach piloted in this year's study – sending responses to the previous study out to each previous respondent to confirm or update – worked well, hopefully fulfilling promises previously made that we would try to minimise the burden placed upon alumni during the project.

Two aspects of the project newly emerge for consideration, going forward. One is the increasing number of alumni (currently only URF alumni, but this should expand to DHFs with time) who have now progressed to retirement. This begs the question of whether to try to continue to engage them, in order to learn about their activities beyond formal employment, or whether they should simply exit the tracking project. With increasing longevity and fluctuating or decreasing younger populations, it could be important to understand the nature and range of contributions these highly talented scientists make as they reach and progress through formal retirement. This could merit introducing some additional questions specifically for 'retired' alumni for this purpose.

Future iterations of the survey will potentially each be a snapshot of a moving workforce population, i.e. each survey will include three populations – some 'new' alumni, the majority who continue to be in scope and can potentially provide updates on their progression and achievements, and a portion who have entered retirement and essentially dropped off the other end of this career spectrum. Thus, the project will not develop fully cumulative views of these schemes, but always be snapshots with some element of accumulated information.

The second issue, which is potentially harder to solve, is how to sustain engagement with alumni who enter pathways other than academia/HE, so that they can be represented fully in the Career Pathway Tracker project. We strongly suspect, from work updating contacts prior to deploying the survey, that the contacts list currently held (and therefore the survey response sample too) under-represents alumni who have entered other career sectors.

In general, most current academic staff can be identified through an internet search, as their university encourages them to be 'visible' and maintain a personal webpage which provides their contact details openly. By contrast, most alumni working in other sectors do not have such visibility, presumably because their employers do not encourage or allow such personal web presence. The difficulty for this project arises where alumni move to such employment and do not update their contact details held by the Royal Society. Once the original contact data are incorrect, such alumni are only able to be targeted by a survey such as this if a web search can identify their current location and their contact details obtained. Experience suggests that not all can be found and for many that are there are no readily available contact details. As a result, alumni in these other sectors are almost certainly under-represented in the survey results, which may have implications for any evaluation findings.

To counter this, we recommend the Society attempts to engage with scheme alumni more broadly, i.e. across all sectors, in order to maintain contact details more consistently. If this issue continues to be problematic, we recommend consideration of other tracking options to maintain at least some information about such alumni, even if they cannot be engaged directly through a survey. For example, it could be possible to harvest limited information from web-based sources during search for alumni for whom there are no current contact details (such as current employer, and/or occupation), which could be used to supplement the total data about

alumni that is collected, analysed and held. Trialling the extent to which this approach is effective, and how any such supplementary data could be used in evaluative terms, would be valuable prior to conducting further surveys in the Career Pathway Tracker project.

Appendix 1. Career Pathway Tracker survey 2024

2023 Royal Society research fellows' career tracking survey (new fellows)[12]

A: Introduction

Please confirm which type of Royal Society research fellowship you have received:

- University Research Fellowship (URF)
- Dorothy Hodgkin Fellowship (DHF)
- Both URF and DHF
- Sir Henry Dale Fellowship (SHD, in partnership with Wellcome)
- Other early career Royal Society research fellowship scheme [please specify]
- None of these

Are you currently undertaking one of these early-career fellowships?

- Yes, I am currently still undertaking one of these fellowships
- No, I have completed one or more of these fellowships

In which Royal Society subject group/area was your research during your fellowship (if you held more than one award, answer for the most recent one)
Dropdown list

Was that award held on a full-time or part-time basis (if you held more than one of these awards, please answer for the most recent one)

- Full-time
- Part-time
- Full-time and part-time at different periods of the award (explain briefly in comment box)

B: About you now

What is your current employment status?

- Employed
- Self-employed
- Not working
- Retired

What is your current main position (job title)?
(e.g. PVC- Research, Research Director)

Please name your current institution/employer

In which sector are you working?
Dropdown list

In which country are you working?

- UK
- EU nation
- Outside the EU

[12] Note that introductory and some other explanatory text, and items within long dropdown lists, have been omitted for the purpose of brevity

If outside the UK, please select the county in which you are working
Dropdown list

How long have you been in your current position/job? Please type in the number of years: e.g. 12

Do you hold any other remunerated positions? *Yes/No*

Are you currently research-active? *Yes/No*

What is your current research specialism?
Dropdown list

If you lead a research group, please indicate its size
Number of doctoral researchers
Number of postdoctoral research staff
Number of other researchers
Number of technicians/professional staff

C Perceptions of impact of the RS research fellowship

To what extent do you agree with the following statements about the impact of your RS fellowship on your career? Please note that not all of these statements are positive.
The fellowship...
Scale of agreement: Strongly agree / agree / disagree / strongly disagree / not applicable

- Made it easier for me to secure my first permanent position after the fellowship
- Has facilitated faster career progression than I would have achieved without it
- Has not impacted on the level of seniority that I have reached in my career
- Enhances the way that senior colleagues perceive me
- Has not made any significant difference to my career path

How valuable has your fellowship been in relation to the following aspects of your development as a research leader?
Scale: Very valuable / valuable / not very valuable / not at all valuable / not applicable

- Developing leadership capabilities
- Developing my teaching practice
- Enabling multi-/cross-disciplinary work
- Establishing collaborations
- Freedom to explore innovative approaches
- Improving my self-confidence
- Opportunity to commercialise my work
- Opportunity to pursue a new line of research
- Stronger publication record
- Successfully obtaining subsequent grant funding
- Other (*please specify below)*

To what extent were the following potential benefits of your fellowship of value to your development as a research leader?
Scale: Very valuable / valuable / not very valuable / not at all valuable / not applicable

- Prestige of having a Royal Society research fellowship
- Opportunity to interact with Royal Society research fellow peers
- Opportunity to interact with Fellows of the Royal Society (FRS)

- More time to focus on research
- Flexibility of funding arrangements
- Opportunity to access Royal Society training and networks
- Other (*please specify below)*

In your own words, could you summarise what difference you believe your Royal Society fellowship made to your career?

D Your career progress

Is your current role (i.e. the position you described in section B) your first significant position after completing your RS fellowship? *No/Yes*

In the following questions, please tell us about your **first significant position after you completed the fellowship.** (If you held more than one RS fellowship, please provide details of your first position after completing the first fellowship)

- Job title
- Institution/employer name
- Country
- Sector
- Specialism

In which year did....

You obtain your PhD?
You start your Royal Society research fellowship (URF, DHF or SHD; if more than one indicate the most recent)?
You complete your RS research fellowship?
Your first doctoral student successfully complete their doctorate?
You publish your first significant publication in your area as a Principal Investigator?
You recruit your first research group member and/or gain line management responsibility?
You first obtain a permanent or tenured post?
You first obtain a professor-level role or equivalent?
You successfully first secure a significant research grant as a Principal Investigator?

In your career to date, including your fellowship, have you experienced any of the following?

Being unemployed or looking for work?
Number of occasions before fellowship
Approximate cumulative time in months
Number of occasions since fellowship
Approximate cumulative time in months

On maternity or paternity leave from employment?
Number of occasions before fellowship
Approximate cumulative time in months
Number of occasions during fellowship
Approximate cumulative time in months
Number of occasions since fellowship
Approximate cumulative time in months

Not working due to looking after children or caring responsibilities (beyond maternity/paternity leave)?
Number of occasions before fellowship
Approximate cumulative time in months
Number of occasions during fellowship
Approximate cumulative time in months
Number of occasions since fellowship
Approximate cumulative time in months

Not working due to ill health?
Number of occasions before fellowship
Approximate cumulative time in months
Number of occasions during fellowship
Approximate cumulative time in months
Number of occasions since fellowship
Approximate cumulative time in months

Not working due to another reason [e.g. time out]?
Number of occasions before fellowship
Approximate cumulative time in months
Number of occasions since fellowship
Approximate cumulative time in months

During your career, have you experienced significant periods of mobility of the following types? By a significant period we mean at least 3 months in duration (each, and include long term jobs in another sector/country within this).

Working in another country (to your normal place of residence)?
Approximate cumulative time in months before fellowship
Approximate cumulative time in months during fellowship
Approximate cumulative time in months since fellowship
If you worked in another country (or countries) after your fellowship for more than a year as a contiguous period, please list the country/countries

Working in a sector outside academia/public research
Approximate cumulative time in months before fellowship working in another sector
Approximate cumulative time in months during fellowship working in another sector
Approximate cumulative time in months since fellowship working in another sector

Please give an indication of how frequently you currently contribute in these ways:
Scale: More than once per year/Once per year/Never

- Public engagement with science
- Knowledge exchange or commercialisation activity
- Policy-making activity (e.g. at national level)

How many international collaborations are you actively engaged in currently at co-investigator level? A single grant with multiple international collaborators should be counted as one instance.

Is there anything else you wish to add in relation to your career path?

E Your achievements

Please tell us briefly about any significant national/international prizes and awards that you have achieved during or since your fellowship, including election to an Academy

Of which two research outputs or research impacts you are particularly proud, and why? Please explain briefly in the boxes below.

- 1st research output
- 2nd research output

Please tell us about up to two commercialisation, economic- or industry-related achievements (such as patents, licensing, spin-outs, industry collaboration) and briefly why they are important.

- 1st commercial achievement
- 2nd commercial achievement

Please tell us about up to two other achievements of which you are particularly proud, or other key milestones in your career, and briefly why they are/were important to you

- 1st other achievement/milestone
- 2nd other achievement/milestone

F Leadership

In total, how many doctoral researchers have you trained to successful completion?

How many doctoral researchers do you currently supervise?

In total, for how many postdoctoral researchers have you been responsible *(e.g. have you trained)?*

For how many postdoctoral researchers are you currently responsible?

For how many people in total are you currently responsible?

G About you

What is your current age in years?

What is your nationality?

- UK
- EU nation
- Rest of World country

What is your ethnicity?
Dropdown list

What is your gender?

- Male
- Female
- Other
- Prefer not to say

Do you consider yourself to have a disability?

- Yes
- No
- Prefer not to say

H. Future engagement

Please confirm that you give the Royal Society permission to hold the data collected in this survey for the purposes of tracking the careers of its research fellows. Note: If you tick no to this question your responses will be included in aggregated analysis of this survey data but not retained beyond that.
Yes/No

Do you give permission for the Royal Society to contact you in future as part of its tracking project?
Yes/No

Please give the email address you would prefer was used to maintain contact with you.

Would you like to be alerted when a report on this career tracking research is published? *Yes/No*

Would you be willing to tell us more about your career story or participate in a research interview?
Yes/Maybe/No

For reference, please provide a link here to an online profile (such as Linkedin) or other online CV

For reference, please provide your ORCID number if you have one

Finally

Is there any other information that you think would be useful to us in conducting this research?

Appendix 2. Classification of employment level of academic staff

Job titles provided by respondents working in academia/HE were coded to the occupational stratification developed by the Universities and Colleges Employers Association (UCEA) which is used by the Higher Education Statistics Agency (HESA) when recording data about academic staff.[13] For academic staff of interest in this project, the stratification runs from Level L (which includes junior lectureship positions and post-doctoral researchers/assistants) through to Level A which is Vice-Chancellors (a simplified version of which is shown below. Levels G and H are not currently used. Several of the Levels are of particular interest here, especially F (Professor), I (Reader, which also includes Associate Professor and Principal Research Fellow) and J (Assistant Professor, Senior Lecturer, Senior Research Fellow). UCEA explicitly allocates a Royal Society Research Fellowship position to Level J. Lectureship positions are classified either as Level K (subject lecturer) or L (junior lecturer), depending on the seniority of the post.

Level	Description	Example job title or descriptor
A	Head of institution	Vice-Chancellor
B	Highest level of manager reporting to Head of institution	Deputy/Pro Vice-Chancellor
C	Head/Director of major academic area; Director of function/s	Executive Dean; Dean, Head of College; Finance Director; Director of Research
D	Head of an academic centre	Head of Department; Associate Dean; Director
E	Head of small centre; senior function head	Director; Division Leader; Head of Human Resources
F	Professor; function head	Professor; Functional Manager
I	Senior academic lead	Associate Professor; Reader; Principal Lecturer; Principal Research Fellow
J	Senior academic staff	Assistant Professor; Senior Lecturer; Senior Research Fellow; Royal Society Research Fellow
K	Academic staff	Subject Lecturer; Postdoctoral Research Fellow; Research Fellow; Research Associate
L	Academic staff	Lecturer; Researcher; Postdoctoral Research Fellow/Associate/Assistant; Research Officer

[13] https://www.hesa.ac.uk/collection/c21025/a/levels