



Engineering and
Physical Sciences
Research Council

A series of thin, orange, hand-drawn style lines that crisscross diagonally across the teal background, starting from the right edge and extending towards the left.

Understanding our portfolio

A gender perspective

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Introduction

Underrepresentation of women in the engineering and physical sciences remains one of EPSRC's largest equality, diversity and inclusion (ED&I) challenges and is a well-known issue in the engineering and physical sciences community.

Building on the recent publication of harmonised UKRI diversity data, EPSRC has undertaken a detailed analysis focused on gender to better understand the portfolio that we support. The report looks at gender disparity in our large grant portfolio, where a large grant is defined as a grant in excess of £10 million. Our aim in publishing this investigation is to raise awareness of the trends that we see as a funder and promote discussion in the community to support changes across the sector.

Approximately 18% of the engineering and physical sciences (EPS) academic community and 26% of the student population are female according to the Higher Education Statistics Agency (2017/18) with similar trends observed in associated business and industries. Under representation of women in the engineering and physical sciences particularly at senior levels, is a long-standing diversity issue in our community and one that we aim to work in partnership to address.

We recognise that for a growing number of people, gender does not simply refer to male and female. Currently UKRI collects gender data through the Je-S portal, across three options: Male, Female and Not Disclosed. While we recognise that a broader range of gender identities exist, we used our Je-S data for the analysis for this report.

Action we have taken

EPSRC has implemented activities to promote inclusion over the last five years which will influence the trends observed, such as:

- Introducing a mixed gender panel policy to improve under-represented gender diversity of EPSRC advisory and peer review bodies.
- Refreshed the membership of the EPSRC Peer Review College and actively encouraged nominations from underrepresented groups.
- New policies introduced around support available for those with caring responsibilities and promoted flexible working.
- Made improvements to our peer review processes which seek to remove potential barriers and biases.
- Clarified processes for sharing any personal circumstances with EPSRC.
- Carried out Equality Impact Assessments on all events, calls and, increasingly, also for major policy changes.
- Funded research into diversity challenges, through the Inclusion Matters portfolio.

Since EPSRC began actively working in this space, we have seen improvements in our gender diversity data by number related to applications, awards and award rates*, albeit incremental.

*Award Rates are the number of awardees as a proportion of the number of applicants. Until recently this was known as Success Rates.

Data context and methodology

Value and award rate data in this report is presented at an aggregated level covering data on Principal Investigators only, over a twelve-year period from 1st April 2007-31st March 2019*. Training grants and grants which were awarded through a non-competitive process (e.g. Open Access grants) have been removed from the data. Very large research grants (in excess of £20 million) remain within the data, where they are removed it is clearly articulated. The data has been stratified into grant value (£) ranges where differences in applications and award rates by gender are explored.

In this report we present EPSRC diversity data by gender which has been analysed in three ways:

1 By number

All grant types contribute equally to the analysis, representing a single application regardless of scale or duration.

2 By unique identifier

Individuals who have made multiple applications/hold multiple grants will only contribute once to diversity statistics.

3 By value

Analysis is done using the financial value of the grant as a proxy for scale and length of award.

Diversity data for Co-Investigators, Fellows and students is available through the UKRI diversity data publication (<https://www.ukri.org/about-us/equality-diversity-and-inclusion/diversity-data/>) and is not included as part of this analysis.

Our data has shown an increase of female participation in both applications and involvement in peer review since 2007-08 to 2018-19.

Based on the harmonised diversity data, we see that:

- The gender composition of applications has changed from **12% female in 2007-08 to 14% in 2018-19**.
- Over this period **award rates by number have changed, becoming equal for males and females in 2015-16** and remaining largely within 2 percentage points of each other over the last few years.

EPSRC's peer review diversity data shows:

- **The proportion of women involved in peer review has increased**, with panel membership moving from 18% female in 2014-15 to 30% in 2018-19.
- There has also been a **large increase in female panel chairs**, moving from 14% in 2014-15 to 31% in 2018-19.

Despite this progress, issues remain and one of the most frequently cited observations by both EPSRC staff and the wider community is the lack of female Principal Investigators (PIs) in EPSRC's large by value grant portfolio, evident from both community events and associated data. In response to constructive challenge from members of the community, EPSRC has undertaken a new data analysis to both better understand the portfolio we support and reflect back to the community the applications we receive and the portfolio we fund from a gender perspective. This is with the aim as a community to better understand the wide range of factors which influence the representation of women in EPSRC's portfolio and across the landscape.

* 1. Grants are grouped into financial years based on when the funding decision was made.

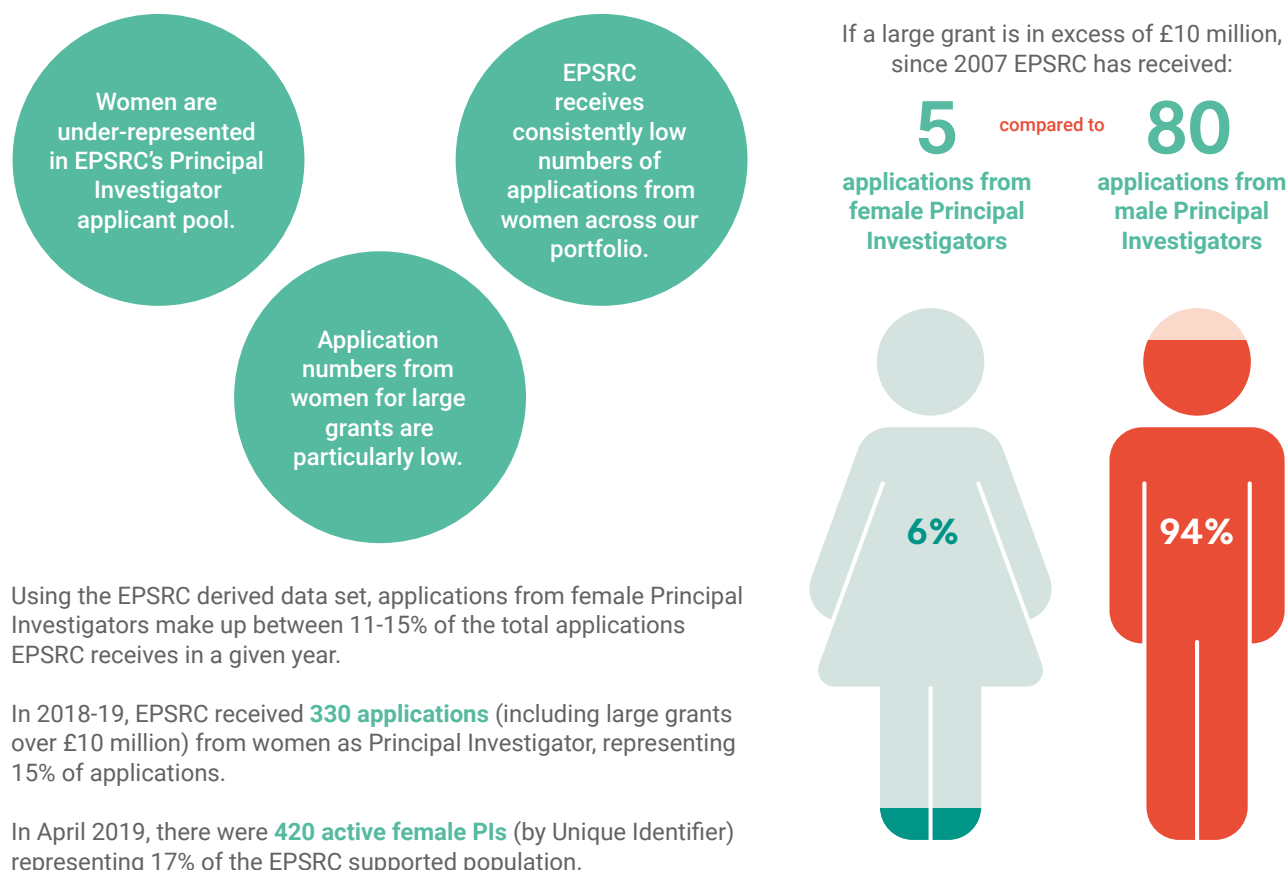
2. The background contextual information on number of applicants, awardees and the award rate by number for 2014-15 to 2018-19 is based on harmonised data used in the UKRI June 2020 diversity data publication.

3. For prior years and for analysis of award values and award rates by value, the data is a slightly wider EPSRC data set which includes grants with PI changes or multiple PIs, institute grants, as well as grants with no lead/sole joint funder. As the focus of this publication is applications for large grants, it is appropriate to include such grants.

4. Note that the harmonised data does not exist for years prior to 2014-15.

5. Numbers are rounded to the nearest multiple of 5 to protect the confidentiality of individuals. Where we have analysis from both the UKRI and EPSRC datasets, the results are very similar, differing by less than two percentage points.

Application numbers



Analysis by grant value range across the 12-year analysis period, shows the number of applications received decreasing as grant size increases. Reviewing applications in this way highlights that applications from female Principal Investigators account for a lower proportion of larger grant value ranges than the smaller ranges.

Grant value range (£)	Applications to EPSRC	Applications from female Principal Investigators	Proportion of female applications (%)
£0–£500k	25140	3325	13%
£500k–£1million	5915	715	12%
£1–1.5 million	1505	230	15%
£1.5–2.5 million	735	90	12%
£2.5–3.5 million	270	30	11%
£3.5–5 million	305	35	11%
£5–10 million	355	40	11%
£10–200 million	85	5	6%

Award rates

Award rates by number are broadly equal across gender.

Award rates by grant value are not equal and a clear trend emerges over the data period.

Historically EPSRC has analysed its portfolio using a by number analysis, which shows that award rates by gender are broadly similar across the analysis period. In 2018-19, award rates were 25% for female applicants and 26% for male applicants.

A new by value analysis*, shows some differences between award rates. In 2007-08, award rates were broadly similar to those calculated by number. However:

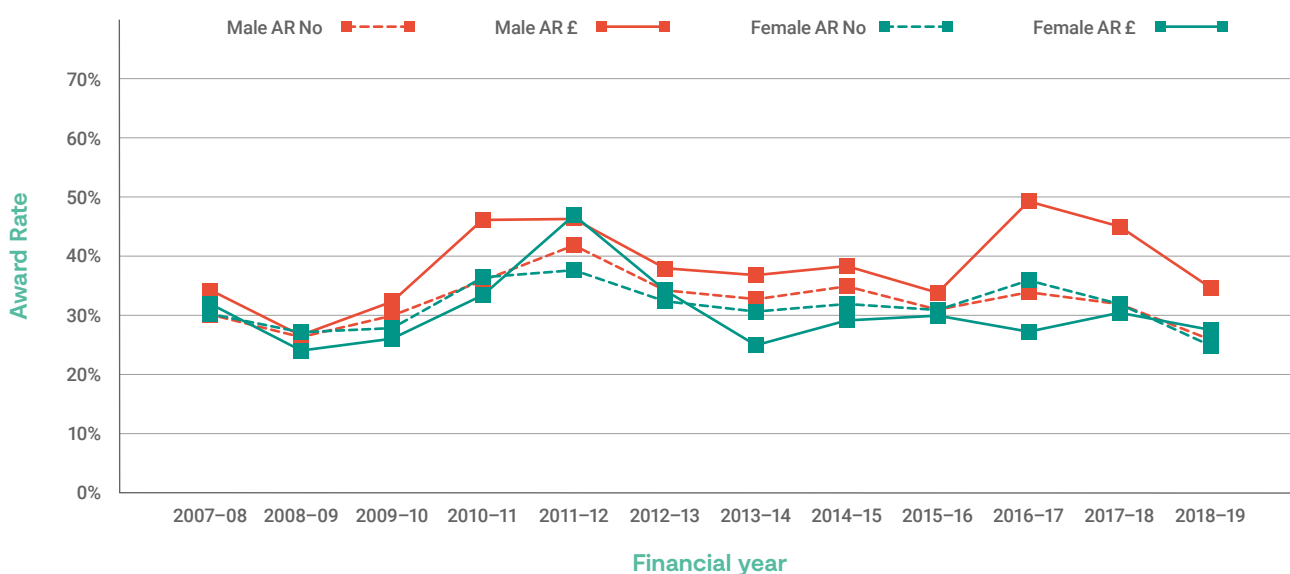
- In 2009-10, this pattern changed for male applicants, with award rates by value rising and staying above the by number award rate.
- In 2013-14, this pattern changed for female applicants, with award rates by value dropping below the by number award rate until 2017-18.

Except for 2011-12, the female by value award rate is consistently lower than the male award rate with variations in the extent of the difference.

The largest difference was in 2016-17, with a 22 percentage point difference between award rates by value. This is likely to be because exceptionally large grants had been awarded to male Principal Investigators. We recognise that the gender identity of the PI does not reflect the diversity of the grant programme team.

By 2018, award rates by value are 35% for men and 26% for women, presenting a different view of the portfolio to the by number analysis.

Award Rate (AR) of PI by Gender – by Number (No.) and by Value (£) for each FY (2007-08 to 2018-19)



*Award rates by value are calculated from the value of funded proposals as a percentage of the total proposals submitted.

Award rates by grant value

The following chart illustrates findings by grant value range. Due to the small numbers of applications in the higher value grant ranges, it is not possible to share this data broken down by financial year over the period of investigation. The breakdown in the chart below shows the award rate for each grant value range, calculated for the period 2007-08 to 2018-19. This breakdown shows differences between award rates by gender as the value of the grant increases.

Over the value of approximately £2.5 million award rates consistently diverge across genders.

As the grant value increases, the sample sizes decrease. In some years, for applications of value above £2.5 million, no applications were received from women PIs.

The decreasing sample sizes in each of these grant value ranges is the limiting factor when undertaking further analysis, reducing the ability to draw firm conclusions.

Award rates by value become increasingly divergent as grant value increases.

Award rate by grant value range for the period 2007-08 to 2018-19 (by number, by value and by Gender)



Individual applications behaviours

There are large differences in applied for values across genders, with women typically and consistently applying for smaller value grants.

The difference between the largest individual grant applied for and largest individual grant awarded in a given year is different for men and women.



Women applying for larger value grants, appear to be less likely to be awarded that grant.



Men on average apply for more £ per grant than women in all years.

The following considers the largest individual grant applied for and the largest grant awarded by gender. For all but two years (2008-9 and 2012-13) there are large differences in the value applied for across genders, with women applying for lower value grants. This trend remains even if large grants (over £20 million) are removed from the data sets.

All grants

* denotes the grant was awarded

Year	Largest Grant Value Applied for (Female)	Largest Grant Value Applied for (Male)
2007-08	£5.28 million	£51.16 million*
2008-09	£11.99 million	£13.00 million
2009-10	£5.82 million*	£9.09 million*
2010-11	£4.92 million	£184.59 million*
2011-12	£5.08 million*	£10.13 million*
2012-13	£11.06 million*	£11.90 million
2013-14	£5.72 million	£13.53 million*
2014-15	£6.75 million	£42.46 million
2015-16	£5.80 million	£42.00 million*
2016-17	£10.31 million*	£131.76 million*
2017-18	£9.90 million	£75.00 million*
2018-19	£9.99 million	£38.80 million*

With grants over £20 million removed

* denotes the grant was awarded

Year	Largest Grant Value Applied for (Female)	Largest Grant Value Applied for (Male)
2007-08	£5.28 million	£9.73 million*
2008-09	£11.99 million	£13.00 million
2009-10	£5.82 million*	£9.09 million*
2010-11	£4.92 million	£15.53 million*
2011-12	£5.08 million*	£10.13 million*
2012-13	£11.06 million*	£11.90 million
2013-14	£5.72 million	£13.53 million*
2014-15	£6.75 million	£7.94 million*
2015-16	£5.80 million	£10.61 million
2016-17	£10.31 million*	£18.00 million*
2017-18	£9.90 million	£19.44 million*
2018-19	£9.99 million	£13.85 million*

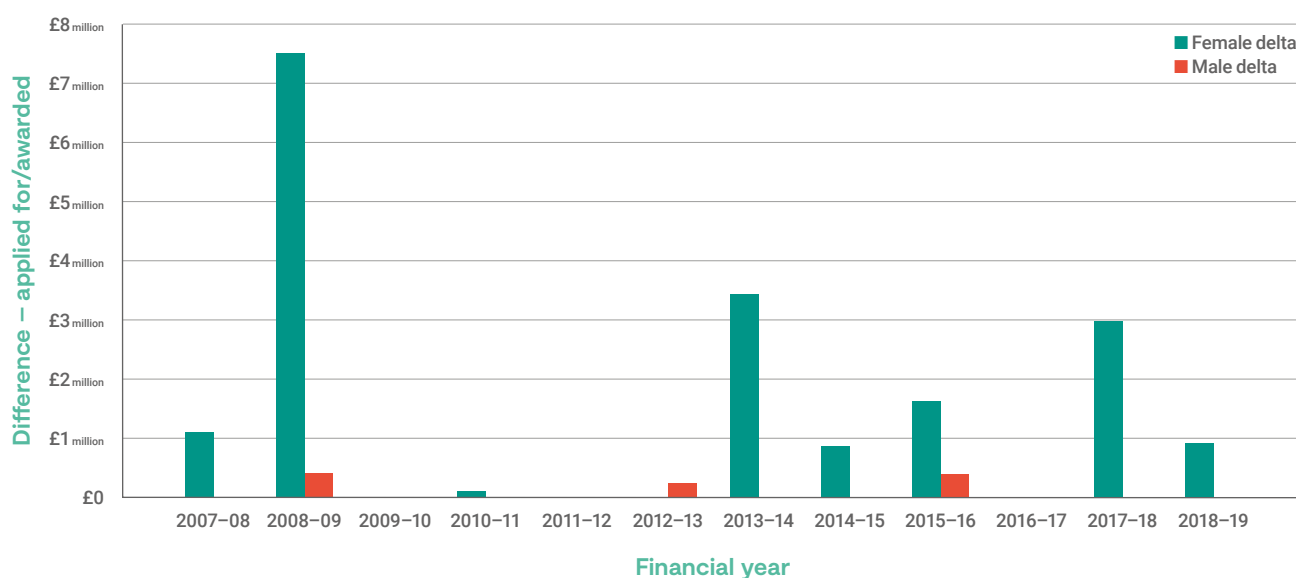
Comparing the 'largest grant by value applied for' and the 'largest grant by value awarded' in a financial year highlights that:

- For women, in 4* of the 12 years investigated the largest grant requested was awarded.
- For men, in 9* of the 12 years investigated the largest grant requested was awarded.

Where the largest grant by value applied for was not awarded, the scale of the difference in value between that grant and the next highest value grant that was awarded varies between the genders. This investigation uses one data point and we are aware that this could be an extreme outlier. Further analysis will be done using upper/inter quartile ranges.

This suggests that where female applicants apply for a larger amount of money, they are less likely to be successful. Women are also consistently applying for grants that are lower in total value. Over the period, men apply for on average £95K per grant more than women.

Difference between largest application and largest awarded grant by gender



*Delta: Difference in value between the largest grant applied for and the largest grant awarded.

Requested grant costs

Equipment and Estates costs are the only headings with notable differences across genders.

A review of requested salaries on grants revealed differences by gender.

EPSRC undertook further investigation to identify the potential source of this difference in grant size. An assessment of the distribution of the requested funding across Je-S fund headings revealed two areas of notable difference:

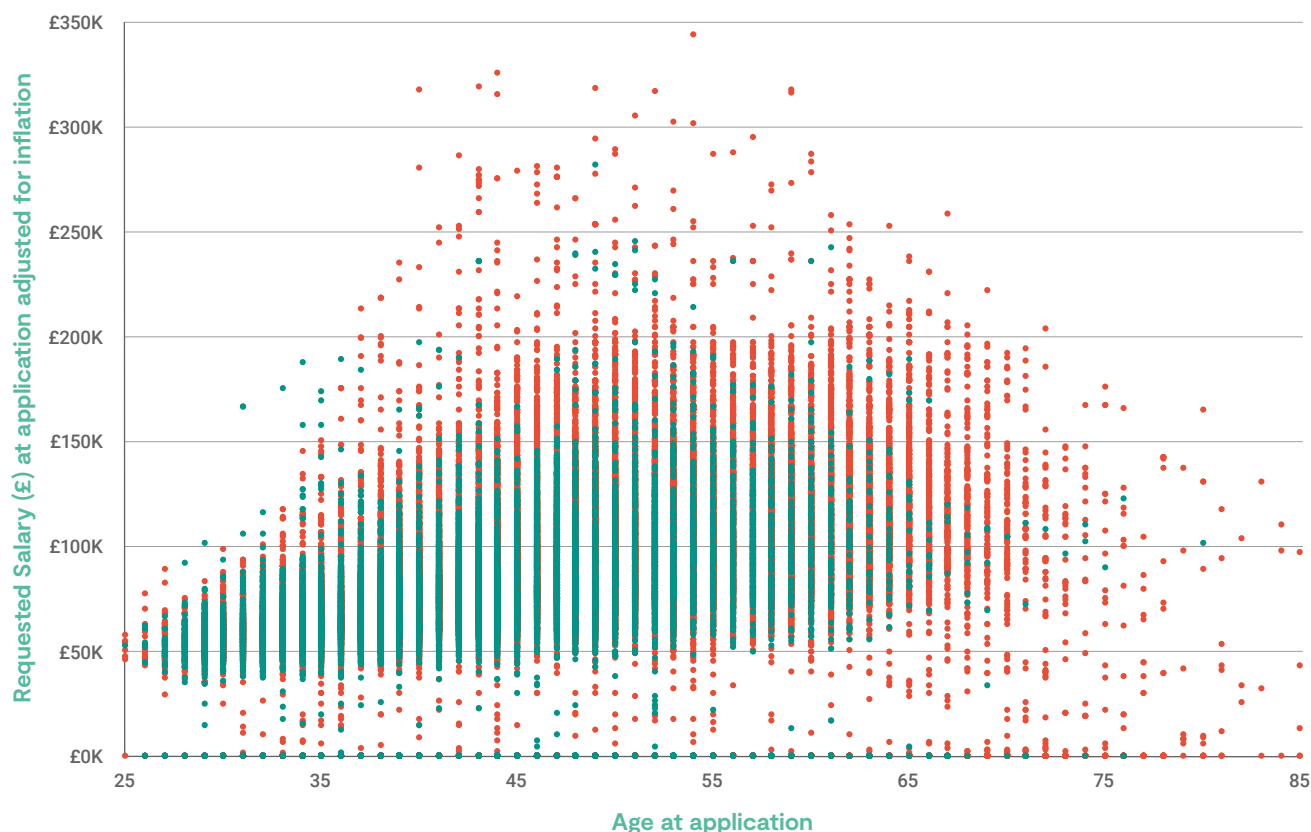
- 16% of male led project costs compared with 5% of female led project costs requested Equipment Costs.
- 37% of female led project costs compared to 29% of male led project costs where due to Estates and Indirect Costs.

Unable to identify other differences, EPSRC then reviewed requested salaries* on all grant applications over the review period. This revealed:

- Men, on average, apply for funding at an earlier age and continue to apply later than women.
- Up to the age of 35 requested salaries across genders appear comparable.
- After this, as a general trend, male requested salaries rise faster and higher than requested female salaries.

Requested Salary (adjusted for inflation) and age at application by gender

● Male ● Female



*Requested salaries are calculated using the rate for the investigator averaged over the planned duration, based on an actual salary. The salary rate is the gross salary rate, including national Insurance and Superannuation but not indexation.

Key findings

1 Female Principal Investigators are under-represented in applications

Low application numbers are seen across the portfolio, in particular for applications for grants of a larger value. Since determining an 'eligible' population for large grants is complex, we are unable to definitively say that this is under representative but 6% of the large grant applications that we have received over the reporting period are from women which is below the HESA engineering and physical sciences female population which is estimated at 18%.

2 While award rates by number are similar, they are not by value

Investigation shows that the female by value award rates are consistently below male award rates, to a varying extent. Above a grant value of approximately £2.5 million, award rates by gender consistently diverge. EPSRC cannot equate this value to a particular scheme or funding mechanism. While affected by small application numbers and potentially disciplinary value differences, this disparity grows as the value of grant increases. The numbers of awards are too small to draw statistically valid conclusions.

3 Differences exist in the applied for grant value between genders

A study of individual grants highlights women consistently apply for smaller value 'large' grants. The numbers of awards are too small to draw very firm conclusions regarding the lower frequency with which larger value grants from female applicants are awarded. Further investigations will be performed.

4 No noteworthy differences by gender in costs added by applicants

In seeking to identify potential contributing factors for the differences in grant size by gender, EPSRC identified differences in equipment costs, which made up a larger proportion of costs on applications from male PI's. There were also differences in estates and indirect costs, however proportions could be affected by overall grant size.

5 Differences in requested salaries could be an important factor

Unable to identify a difference in costs added by applicants, EPSRC reviewed requested salaries on grants by age. This revealed male requested salaries rise faster and higher than requested female salaries, reflecting the known gender pay gap that exists in universities. Making the assumption that experience or senior research organisation role is important as a PI on a large grant and using age as the best available proxy for career experience, this trend would have a larger impact as you move up the grant value ranges.

Next steps

We have undertaken this investigation, with a view to better understand the applications we receive and the portfolio we support from a gender perspective. This forms part of our commitment to support a diverse and inclusive research environment where there is equal access to opportunity. We are sharing our findings with the wider community to enable an open dialogue about the trends that we see and enable us to work together to achieve change in our community.

We realise that the patterns that we see in our data are shaped by a wide range of individual researchers whose motivations and personal circumstances vary. We recognise that two data points in our analysis may display the same trend but for different reasons. As a result, the analysis shows overall trends and patterns that are seen by us as a funder but does not identify the causal factors and/or speculate as to the influences which generate and contribute to this data, some of which may reflect the broader culture and environment.

We are also conscious that some members of our community may feel disenfranchised by the report's findings but, we hope that in sharing our findings we can promote greater discussion and understanding of the challenges that we as a community face.

Having completed this investigation, our next steps are to:

- 1 Share** our findings in this report with the broader community in the spirit of openness and to promote comment.
- 2 Seek input** from our community via a 'Have your say' campaign to better understand the trends that are seen and what might be influencing them from an individual experience and perspective.
- 3** Use this information to **take action** to help to minimise any barriers identified related to EPSRC opportunities and processes.
- 4 Promote discussion** of the findings across the engineering and physical sciences community, recognising that the trends we see as a funder will be influenced by and in turn influence other aspects of the sector.
- 5 Seek testimonials** to showcase both the diversity of opportunities in EPSRC's portfolio and the different people who lead them.



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Accessibility

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