THE ROYAL SOCIETY

Royal Society submission to the Government Equalities Office consultation on Closing the Gender Pay gap

Introduction

1. The Royal Society welcomes the opportunity to respond to the Government Equalities Office consultation on Closing the Gender Pay Gap.

2. The Royal Society is the national Academy of science in the UK. It is a Fellowship of some of the world's most distinguished scientists, drawn from all areas of science, engineering, and medicine.

3. Diversity is essential to delivering excellence in science, technology, engineering and mathematics (STEM). A diverse and inclusive scientific workforce draws from the widest range of backgrounds, perspectives and experiences thereby maximising innovation and creativity in science for the benefit of humanity.

4. The Society is committed to increasing diversity in STEM by seeking out participation from underrepresented groups, in order to build and develop a world in which studying and working in science are open to all.

5. The Society works closely with other academies, learned societies and organisations to maximise the effectiveness of diversity initiatives across the scientific community. The Royal Society and the Royal Academy of Engineering are funded by the Department for Business, Innovation and Skills (BIS) to run a programme of work aiming to improve diversity in the STEM workforce. There are a number of areas of joint working across the two programmes including a pilot diversity in governance programme, data gathering exercises and providing positive and accessible role models. The Society has recently developed a new Diversity Strategy which sets out, for 2015-2018, how the Royal Society will use its convening power and leadership, in partnership with others, to increase diversity in STEM and build a more inclusive scientific community.

6. As the UK's national science Academy the Society will be responding in its capacity to represent the science community and not in its capacity as an employer. The Society currently has 163 members of staff and would be not be covered by the proposed regulations to publish information about the pay of its female and male employees.

7. The following submission therefore addresses four of the questions outlined in the consultation document: Q1, Q17, Q18 and Q19.

Q1: Publication of gender pay information will encourage employers to take actions that will help close the pay gap. Do you:

- ✓ Strongly agree

- ❍ Agree
- ❍ Neither agree nor disagree
- ❍ Disagree
- ❍ Strongly disagree

Do you want to provide any further comment in relation to your answer above (Q1)?

8. The Royal Society strongly agrees with the publication of gender pay information in order to encourage closing of the gender pay gap.

9. While there is limited evidence of the efficacy of publishing gender pay information in closing the gender pay gap alone, it should form one of a series of measures aimed at closing this gap. A small number of universities regularly publish their equal pay audits. All employers should be encouraged to publish their equal pay audits or reviews so that positive progress, best practice and lessons learned can be shared to tackle pay differences. Below we outline in further detail the gender pay gap in the scientific workforce.

10. Our report A picture of the UK scientific workforce published in 2014, includes an analysis of the workforce in terms of gender, disability, ethnicity and socio-economic status and background. It found a complex picture of underrepresentation across these groups.

11. Occupational segregation is considered to be one of the main causes of the gender pay gap, both **horizontal segregation** where women are concentrated in low-wage sectors and **vertical segregation** where women's opportunities for moving up into better paid posts within a sector are restricted.

12. Women are not underrepresented in the overall scientific workforce, but like other sectors women are highly underrepresented at the most senior and higher paid roles in STEM.

13. Women make up a slight majority of the science workforce (50.3%)[1]. This is not the case for the non-scientific workforce and the total workforce as a whole (45.3% and 46.3% respectively). There are, however, gender disparities within socioeconomic classification (SEC) categories, with women in the scientific workforce underrepresented in all but three categories. Men in the scientific workforce are more than twice as likely to be in the highest level SEC category (Higher managerial and professional occupations – SEC 1) as women: 47.5% are in SEC 1, compared with only 23.6% of women.

14. Women are concentrated in the lower level SEC 2 (54.5% of women, compared with 30.1% of men), lower managerial and professional occupations. A similar pattern is also evident in the top two socio-economic classifications within the non-science workforce suggesting a 'glass ceiling' situation – a concentration of women in lower managerial and professional roles and marked underrepresentation in higher senior management positions.

[1] A picture of the UK scientific workforce, The Royal Society, 2014, p. 21. The definition of the scientific workforce used in the report for the analysis of the Annual Population Survey was a wide definition using both Standard Industrial and Occupational Classifications and not just those working in a narrow band of science sectors. This included for example teaching professionals.

15. The scientific workforce is broad and varied and those with science knowledge and skills can be found in sectors as diverse as health and social care, education, food and farming, communications, finance, retail and public sector services.

16. As a whole, the scientific workforce is better paid than people in other occupations, but relatively few people are in the very highest wage band.

17. 47% of the scientific workforce earn within the top 3 wage bands (£30,000 to £39,999, £40,000 to £49,999, and £50,000+), compared with 21.4% of the non-scientific and 27.3% of the total workforce[2]. Compared with the non-science and total workforces, the scientific workforce earn higher wages on the whole. This is likely due to the higher proportion of the scientific workforce in top two socio-economic classifications (SEC 1 and 2), compared with the non-science and total workforces.

18. However, in the higher socio-economic classification categories such as SEC 1 and 2, wages are concentrated in the mid-range wage bands and less likely to be on the extreme ends of the pay scale. A person who works in science is therefore more likely to have a better paid job than someone who does not work in science, although someone working in science in the top socio-economic group (SEC1) is less likely to reach the highest wage band (£50k+) than someone not working in science.

19. The Annual Survey of Hours and Earnings (ASHE) contains information about the earnings and gender pay gap in different employment sectors and occupations. The *professional, scientific and technical activities* sector (which includes a mixture of STEM and non-STEM activities such as legal and accounting activities, architectural & engineering activities, scientific research & development, veterinary activities and advertising & market research) had the third highest gender pay gap for full-time employees in 2012 at 20.5%[3].

20. The Equality and Human Rights Commission note that there is a 'relationship between high average male earnings and wide full-time gender pay gaps in industry sections'[4]. In the professional, scientific and technical activities sector men's median earnings were above the overall median.

21. STEM occupations can be spread across a range of occupational classifications but looking at some of the sub-major occupational groups that would be relevant the full-time gender pay gap for 'Science, research, engineering and technology professionals' was 8.4% and 13.1% for 'Science, engineering and technology associates'[5]. The gap was very wide for health professionals at 19%[6].

22. A recent survey carried out by the Institute of Chemical Engineering (IChemE) found a continuing gender pay gap in chemical engineering, 'with women attaining a median salary of £42,500

[2] A picture of the UK scientific workforce, The Royal Society, 2014, p. 19
[3] Equality and Human Rights Commission (EHRC), Briefing Paper 6, Gender pay gaps, 2012, p. 19
[4] EHRC, Briefing Paper 6, Gender pay gaps, 2012, p. 17
[5] EHRC, Briefing Paper 6, Gender pay gaps, 2012, p. 11
[6] EHRC, Briefing Paper 6, Gender pay gaps, 2012, p. 11

compared to £60,000 for men over a career lifetime. Between the ages of 30 and 50, female engineers are earning, on average 21% less than their male colleagues.'[7]

23. In the UK the median gender pay gap among all academic staff in 2012/13 was 13.6% and 34.2% of male academic staff earned over £50,000, compared with 19.5% of female academic staff[8].

24. Women are underrepresented in senior roles in academia, as they are underrepresented in senior roles across the wider scientific workforce. In 2012/13 women made up 40.7% of all academic staff in SET subject areas but only 17.7% of professors in SET subject areas, although this varies between disciplines.[9]

25. For professors, the overall median gender pay gap was 6.3% although the gap varied considerably between nations. Unfortunately data on earnings and pay gaps in academia broken down by subject area is not available so we do not know the gender pay gap for professors in SET[10] subject areas. This information would be extremely useful and the Society recommends that support is provided to Equality Challenge Unit to be able to provide this information in their annual statistical report.

26. Men also make up the majority of academic senior management roles. In full-time SET subject areas, 78.1% of academic senior managers were men and 21.9% were women.[11]

27. Women are underrepresented in certain disciplines and sectors within science. In academia, the proportion of first-degree students who are female varies from over 79% in subjects in Psychology and Behaviour Science and Veterinary Science to 9.6% in Mechanical Aero and Production Engineering subjects.

28. The reasons for the gender pay gaps are complex but the underrepresentation of women in certain subject areas in STEM and at the most senior roles play a large role. Achieving gender equality therefore has to be a top priority. People from lower socio-economic backgrounds, certain ethnic minorities, and those that are disabled, are also currently under-represented in STEM education, training and employment and action should be taken to remove any pay gaps for those groups in order to make full use of potential talent to the UK and increase UK competitiveness and prosperity.

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[7] http://www.icheme.org/media_centre/news/2015/chemical%20engineering%20salaries%20holding%20steady.aspx#.VcNjT_lVhBc

[8] Equality in higher education: statistical report 2014 Part 1: staff, Equality Challenge Unit, 2014, p.244 & 250

[9] Equality in higher education: statistical report 2014 Part 1: staff, Equality Challenge Unit, 2014, p. 240

[10] Science, Engineering and Technology – a broad definition used by HESA for STEM subjects.

[11] Equality in higher education: statistical report 2014 Part 1: staff, Equality Challenge Unit, 2014, p. 242

Q17: How do you think the Government can most effectively encourage young girls to consider the broadest range of careers?

29. In 2014 the Society published its vision for science and mathematics education over the next 20 years. Our Vision aims to raise the general level of mathematical and scientific knowledge and confidence in the population and seeks to link people's learning and skills to the current and future needs of the economy.

30. A particular concern highlighted in our report is the persistently low numbers of girls pursuing physics and mathematics after 16. Girls accounted for 21% of A-level physics entrants, 39% of A-level mathematics entrants and 28% of A-level further mathematics entrants across the UK in 2015.

31. This low level of participation in post-16 science education flows through to an underrepresentation of women in certain areas of STEM, in particular engineering. In turn, this results in too few STEM graduates and other skilled technical professionals to meet employers' needs. Engineering UK has suggested that equalising male and female labour force participation could increase the UK's GDP per capita growth by 0.5 percentage points per year, with potential gains of 10% of GDP by 2030.

Attitudes to science and maths and STEM careers

32. One of the challenges in developing a scientifically and mathematically informed society is that many young people's early positive attitudes to science and mathematics do not persist into later stages of education. Evidence suggests primary school students' attitudes to science worsen as they progress, in parallel with a similar decline in attitudes to reading and mathematics.

33. Aspirations also vary among children of differing ethnicity, with a large survey of 11 year olds in England indicating that Black Caribbean students were much less likely to say they aspired to a science-related career than their Asian peers.

34. More widely, there appears to be a gap between the perception of science as a good sector to work in and personal interest in doing so. Interviews of 460 teenagers by the Wellcome Trust found that 80% thought science was a good sector to work in. Meanwhile, only 38% of teenagers questioned in an Engineering UK survey picked a STEM subject as their favourite.

35. These gaps might arise from a range of sources: young people and parents often perceive science to be a 'hard' subject, suitable for only the most able pupils; many perceive scientists to be 'mostly white, male and middle-class'; and students are often unaware of the range of careers STEM qualifications can lead to. These issues are particularly acute for families with a low level of qualifications, knowledge, and connections with science.

Recommendations

36. To address these challenges, we recommend in our *Vision* that:
    Increase parents' understanding of how STEM offers many and varied employment opportunities for all children, regardless of their social or economic status.

Build careers awareness from primary school onwards by giving children exposure to role models, such as professional scientists, engineers and technologists.

37. Students need to understand the significance of STEM through better careers awareness and guidance. STEM careers awareness should begin at primary school and teachers should make sure there is no bias with respect to gender, race, ethnicity or socio-economic background.

38. If schools are to offer excellent careers advice and work experience they need to have a stronger relationship with employers. This must be a sustained relationship, where both sides influence each other.

39. A third of the UK science workforce is non-graduate, and by 2020 the UK will need approximately 450,000 new STEM technicians. In order to meet this demand careers advice should promote and raise awareness of the range of vocational options in STEM. School leaders must make careers guidance a priority, and sufficient funding must be provided to enable this.

40. *Our Vision* recommends that we:
    Maintain investment in large-scale, national programmes and events, delivered locally, which provide students with STEM role models and help teachers and families to develop better engagement with academia and industry.

    Make careers information, advice and guidance from early secondary onwards an essential part of the school/college curriculum.

Q18: How do you think the Government can work with business to support women to return to work and progress in their career after having children?

41. In conjunction with Westminster Business School we examined the business case for diversity in the scientific workforce. The report, published in 2014, found strong support for a business case for diversity.

42. Key issues and barriers to entering and staying in STEM careers were identified. Barriers to entering STEM careers operated from childhood and continued through education with a dearth of relevant role models for girls, the tendency for employers to recruit graduates from specific universities, and the stereotypically male associations with certain occupations and work environments that made professions appear unattractive or unobtainable to women.

43. Barriers to progression included the absence of part-time roles and flexible working arrangements, the disproportionate use of fixed term contracts for women and minority ethnic academics, opaque promotion processes, long-hours cultures, operation of the 'old boys' networks', the difficulty in balancing parenthood with a career, inadequate provision for individuals requiring physical adjustments to the work environment, organisational cultures and expectations unattractive to members of minorities, and the absence of effective networking, mentoring and 'sponsorship' between, and of, individuals.

44. Working with businesses to address and remove these barriers to progression would support women to return to work and progress in their career after having children. Good practice can be translated across groups and benefit not just women but other underrepresented groups as well.

45. The recent introduction of shared parental leave (SPL) gives parents more flexibility in how to share the care of their child and is a positive step towards increasing gender equality in the workplace. Take-up of SPL should be monitored and the emergence of any barriers for both men and women identified and addressed.

Recommendations

46. Our business case for diversity report made recommendations on how to increase and promote diversity in STEM including:
    - Increased monitoring of information on employment practices and career progression such as the use of fixed-term contracts, flexible working arrangements and requests, and the progression of different groups through the organisation.
    - Creation and encouragement of social networks accessible to people working or aspiring to work in careers in STEMM, as well as sponsorship and mentoring opportunities, will facilitate entry and progression in STEMM careers.
    - Increased development and use of retention policies such as making reasonable adjustments in the workplace to account for disabilities, enhancing flexible working opportunities to achieve better work-life balance, encouragement for women to return after maternity leave, and offering better development and networking opportunities.
    - Encouragement to employers to foster (or make visible) employment opportunities to potential recruits studying at universities not routinely targeted by employers.

- Monitor and evaluate training programmes and share across the sector when training interventions are effective, this would be particularly helpful to SMEs.

47. General lessons can be learned from existing initiatives such as the Athena SWAN Charter. An independent review of the Charter in 2013 found 'considerable evidence of the positive impact of Athena SWAN on the career development and satisfaction of women working in STEM as well as evidence of the value of Athena SWAN as a driver for improving gender diversity'[12]. Best practice to support women to return to work and progress in their career after having children should be shared with the scientific community for the benefit of all employers.

48. Targeted schemes can also successfully enable individuals to overcome these barriers.

Case study

Dr Patricia Sanchez Baracaldo
Dorothy Hodgkin Fellow

School of Geographical Sciences, University of Bristol
Co-evolution of life and the biosphere

Dr Sanchez Baracaldo didn't think she'd be able to return to science after she took time out to raise her children. But support came from a variety of places, including both a Daphne Jackson Trust Fellowship and a Dorothy Hodgkin Fellowship from the Royal Society designed to support scientists who require flexible working.

Dr Sanchez Baracaldo credits her Dorothy Hodgkin Fellowship with providing the flexible working patterns that helped to support her at a critical point in her career.

"The Dorothy Hodgkin Fellowship brings with it high expectations, and of course I want to fulfil them. But if I didn't love challenges, I probably wouldn't have got the Fellowship in the first place."

Her research helps us understand climate change by looking at how cyanobacteria (also known as blue-green algae) have contributed to global nutrient cycles (e.g., nitrogen, carbon, oxygen) through geological time. Today she enjoys problem solving and talking about science with other scientists and the public. You can read more about Dr Sanchez Baracaldo's research and career on her webpage or watch her film created as part of the 'I wasn't always a scientist' series.

49. It is also important to make employers aware of steps they can take to improve the diversity of their workforce. Good diversity and employment practices benefit all and will help to support women as well as other underrepresented groups to both stay in STEM and to progress in their careers. We are promoting and showcasing via social media to science-based employers the best examples in recruitment and retention where initiatives and schemes have successfully improved the diversity of the workforce, in particular the representation of women, disabled people and those from minority

[12] http://www.ecu.ac.uk/wp-content/uploads/external/evaluating-the-athena-swan-charter-ecu-response.pdf

ethnic backgrounds. Our best practice case studies include case studies from Atkins, BAE Systems, B-MEntor, BT, Caterpillar, the Department of Health, FDM, IBM, Jaguar Land Rover and Microsoft; as well as North Energy Associates. Continuing to champion and share best practice from a wide range of STEM businesses is vital.

Q19: How do you think the Government can make sure that older women are able to fulfill their career potential?

50. Encouraging women to choose a career in science, supporting those that choose to stay in science and increasing the number of women at senior levels will all help to reduce the gender pay gap. Removing barriers raised by gender, ethnicity, disability and socio-economic status to enter into and stay and succeed in a career in science is therefore a priority. This should include barriers for women and other groups at all career and life stages. The government should approach this issue holistically to ensure that there is encouragement and support and barriers are removed to enable women to enter and stay in science throughout their career should they choose to. Below we outline work already underway and opportunities for government to augment these.

51. In order to fulfil the science, engineering and technology roles in the future we need to inspire people of *all* ages to consider a scientific career. Demonstrating that a career in science is open to them and providing role models are key to encouraging women to choose a career in science. The Society seeks to recognise and champion the achievements of a wide range of scientists from underrepresented groups. Our I Wasn't Always a Scientist project reveals the stories of scientists who didn't take traditional routes into their scientific careers with the aim of showing and inspiring adults not currently working in science that it is never too late to consider a career in science. Whether that meant starting out in a completely different industry, taking a career break, or travelling instead of doing A-levels, these scientists show that not everyone follows the same path.

52. Ensuring all young people can get skills that fit the current and future needs of the economy is key to ensuring they can fill their career potential throughout their lives. Approximately 20 per cent of people in the UK workforce need scientific knowledge and training to do their current jobs[13]. Research skills open the doors to jobs in many sectors where the analytical and problem-solving skills acquired through doing scientific research are greatly prized. However, the UK faces an urgent shortage of research skills. By 2020, over one million new workers will be required to fill science, engineering and technology roles. These skills are vital if the UK is to remain competitive internationally and to ensure that people are productively employed throughout their lives. Our Vision for science and mathematics education makes a number of recommendations for government to better link young people's learning and skills to the current and future needs of the economy.

53. Our report A picture of the UK scientific workforce found that for a cohort of mid-career individuals, those women who entered the scientific workforce took longer to do so after finishing education than men did. They were also less likely than men to remain in science throughout their careers. The numbers of women in senior academic and management roles in STEM are so low that encouraging and supporting more women to stay in academic science and reducing barriers is vital. The Government can play an important role in reducing barriers to support women to get back into and stay in science alongside other commitments. This includes:

54. Ensuring that woman are well represented among the proportion of those applying for research grants and offering and accommodating flexible working patterns to ensure the best applicants apply and accept when successful is an important part of increasing and keeping women in

[13] A picture of the UK scientific workforce, The Royal Society, 2014, p. 5

academic science. The Society is currently looking at ways to promote and encourage diversity amongst its grant schemes including ways to attract a higher percentage of applications from underrepresented groups. We are reviewing our promotional material and application forms, encouraging Fellows to support and guide women to apply, establishing training in unconscious bias, and ensuring data is properly gathered and analysed and when issues arise they are dealt with rapidly.

55. Funding decisions are made solely on the basis of the quality of the proposed science but the Society expects host institutions to provide workplace structures that support equality and diversity. We aim to accommodate a wide range of flexible working arrangements in our grants including part-time working, sabbaticals and secondments. There is also provision for maternity, paternity and adoptive leave (other care-related leave is also considered). Our schemes are designed for the best young scientists regardless of who they are or what their circumstances are. Flexible working is built into all of the schemes, including part-time contracts which are genuinely part-time and not full-time work at part-time pay.

56. Supporting schemes designed specifically to support non-standard career paths can also play a role in ensuring that older women are able to fulfil their career potential. The Society's Dorothy Hodgkin Fellowship (DHF) scheme established in 1995 is for outstanding early career scientists in the UK who have a non-standard career path or who require a flexible working pattern due to personal circumstances such as parenting or caring responsibilities or health issues. Funded by a grant from the Department for Business, Innovation and Skills (BIS) as well as donations from individuals and organisations, the DHF scheme supports researchers at an earlier career stage than our other schemes. Whilst all Royal Society programmes are committed to supporting diversity, the focus on flexibility makes the Dorothy Hodgkin's Fellowships particularly attractive to early career female researchers with young families or those returning from a period of maternity leave. In 2014 87% of applicants were female with 100% of award winners female. The Society is seeking further financial investment to allow it to support more female researchers to stay in academic science.

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