



*The Royal Society
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KNOWLEDGE MADE USEFUL

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Equity in the STEM Workforce: A Response from The Royal Society of Edinburgh

Dear Secretariat of the All-Party Parliamentary Group on Diversity and Inclusion in STEM (APPG),

1. I write to you on behalf of the Royal Society of Edinburgh (RSE), Scotland's National Academy, and as Chair of its 2018 progress review into the status of women in science, titled *Tapping All Our Talents*.¹
2. We were pleased to learn that the APPG is following up its valuable inquiry into equity in STEM education with an examination of equity in the STEM workforce. While positive strides have been made in improving gender balance and other diversity markers, the sector remains largely uneven in the extent to which different protected characteristics and groups are represented across STEM professions. As the inquiry notes, the value of a diverse and resilient STEM sector cannot be overstated as society continues to contend with the COVID-19 pandemic as well as more enduring challenges such as climate change and the rapid digital transformation of our daily lives.
3. We note the inquiry appears to be predominantly geared towards organisations operating in the STEM sector and agree that the real-world insights that are generated through this direct engagement are critical to understanding the true scope of the issues and to devising the most appropriate recommendations. While the RSE is not a STEM employer, as Scotland's National Academy it has used its vast expertise and practitioner experience across its Fellowship and Young Academy of Scotland, as well as its convening power, to explore the issue of women in STEM in depth. Through our own inquiries into women in science, we have sought to understand how the presence and profile of women in Scotland's science sector can be further advanced. Alongside this, we have continued to celebrate and promote their innumerable achievements through an extensive programme of public engagement activities.²

¹ <https://www.rse.org.uk/inquiries/womeninstem-2018/>

² Notably, our *Women in Science* portrait exhibition, featuring 26 of our Fellows, highlighted just a small subset of the many dedicated and impressive women conducting ground-breaking research and meaningful science engagement work in Scotland to help inspire the next generation of women scientists. The exhibition proved to be hugely popular and two 'travelling' versions were produced that crossed all corners of Scotland, from the Festival of Politics at Scottish Parliament to Borders College to the Belladrum Tartan Heart Festival near Inverness, and beyond. One of these traveling versions is still installed at Edinburgh Airport, where it has been viewed by over 3 million passengers and counting. A digital version can be viewed here: <https://www.rse.org.uk/wis/guide/>



4. Of the six consultation questions posed, we provide answers to four, based on their relevance to our existing evidence base. **Please note our answers to question three constitute our main recommendations for further action.**

2. Where is there inequity across the different protected characteristics and how are different communities impacted across different:

- **STEM disciplines or sector/subsectors**
 - **types of organisation (e.g. private, public, non-profit)**
 - **type of STEM activity (e.g. academic research, education, engagement, commercial, funding)**
 - **job levels and/or qualification.**
5. Through a public consultation, a series of roundtable discussions and a review of the literature and data available, the RSE revisited its 2012 inquiry into women in STEM in 2018 to see how the context had changed in the intervening years. The 2012 report had shown that a worryingly high proportion (roughly three quarters) of female graduates are lost from the STEM 'pipeline.' The 2018 report pointed to some encouraging signs of improvement, such as increased female representation in the workplace (for example, on boards) and a higher number of female STEM graduates remaining in the sector in Scotland. However, other measures have stagnated or even declined.

Business and industry

6. While the proportion of women entering the workforce in certain STEM sectors is poor, the proportion progressing to the highest levels of leadership is significantly worse; and figures show the gender pay gap remains an entrenched feature of the UK economy.
7. There is **little consistency across industry on the collection and publication of gender-disaggregated data on participation, progression and retention.** And there is a **paucity of intersectional data** that reflects the experiences of people with a combination of protected characteristics, both in information collected and published by industry; and in labour market statistics gathered by the UK and Scottish Governments. Research suggests that even where data on female representation at different levels are tracked internally, few businesses integrate action on gender equality into performance evaluation of senior managers. **Too often, gender equality is seen as an issue for women, or for the HR department.**
8. Key barriers as understood in 2012 remain the same: **the nature of STEM careers, characterised by fast-paced change and few quality part-time positions; pervasive implicit and sometimes explicit bias; and the impact of family responsibilities and career breaks that fall disproportionately on women.**
9. **Recruitment and promotion opportunities** were particularly highlighted as points along the career path at which women are held back, with calls for employers to audit their policies and processes and embed equalities best practice.

Academia

10. **The greatest falls in female representation along the academic pipeline continue to be seen between Lecturer/Reader level and the most senior academic staff: Professors.** In fact, the steepness of the drop between these levels in some areas, notably Chemistry, Biology and Engineering, has increased since 2008. The progress made in raising the proportion of women at Lecturer/Reader level has not been matched to the same extent by increasing numbers of female Professors. **Across all disciplines, the proportion of female Professors remains low, at between around 10 and 15%, except Biology where the figure stands at just under 20%.**



Nevertheless, **there has been some marked progress in increasing the proportion of female Professors in some disciplines between 2008 and 2017. Mathematics** saw the largest proportionate increase in representation: starting from a very low base of only 3% of female Maths Professors in 2008, this has more than **trebled** in the period to stand at 10% in 2017. The proportion of female **Professors in Chemistry also doubled in the period**, from some 5% to 10%.

11. The **barriers** to gender equality in the STEM workforce apply equally to the STEM academic workforce as to business and industry. They relate to **broad themes of the nature and organisation of STEM careers, widespread implicit bias, the impact of family responsibilities and careers breaks and access to research resources.**
12. **There is little evidence of innovative approaches to introducing fast-track career paths** for highly promising young academics that would enable them to establish themselves to a greater degree at an earlier stage, avoiding the current coincidence between key career progression points and having children.
13. Another long-standing issue is the **call for universities to recognise, particularly in promotion criteria, the value of all contributions by academic, support and professional services staff; and parity between research, teaching and leadership.** Staff should not be channelled into teaching or pastoral roles, for example, based on their gender or as a consequence of having taken one or more career breaks at an earlier stage.
14. **Both individuals and institutions responding to this review highlighted the challenge for female STEM academics of exclusion from male-dominated informal networks; and the power of dedicated mentoring and women's networks to support career progression.**

3. Where are there evidenced inclusive behaviours and policies within different organisations, subsectors, sectors and countries on:

- **Recruitment; and/or**
- **Retention**

15. The inquiry highlighted several case studies of successful Scotland-based initiatives aimed at improving gender representation and inclusiveness in the STEM workplace (categorised according to either business and industry or academia). These include:

Business and industry

16. **Equate Careerhub** (<https://equatecareerhub.org.uk/>) is the only dedicated website in Scotland focused on the recruitment of women to science, engineering, technology and built environment careers. The website provides the latest job opportunities across these vital sectors and supports progressive employers to reach out to women, encouraging them to apply for roles which are traditionally male dominated. **The website acts as a first step for many employers to pursue further positive action measures and assists them to review their recruitment processes.** The aim of the initiative is to radically increase the number of women in STEM roles and encourage employers to consider their recruitment processes and implement more flexible, fairly paid and quality part-time work. Careerhub actions include:
 - a. Developing a network of employers who are keen to recruit women in new and inclusive ways
 - b. Providing job advertising space on Equate Scotland's dedicated site and social media
 - c. Reviewing job adverts and descriptions for gender biased language and imagery
 - d. Encouraging employers to offer flexible or part-time roles
 - Training employers in using language more inclusively and taking proportionate positive action measures



17. A collaboration between Equate Scotland, City of Glasgow College and partners in the Netherlands and the Basque Country, **ENGENDERING STEM** (<https://www.engenderingstem.co.uk/>) **offers support to SMEs in the STEM sector to take steps to enhance gender equality.** This support takes the form of a free online self-assessment tool and one-to-one consultation support which identifies manageable and incremental steps that employers can take to improve their gender balance. In addition, the scheme offers SMEs the opportunity to showcase, and learn from, good practice on equality on the European stage.

Academia

18. Scotland's universities undertake a range of initiatives to minimise gender-related disadvantage. These range from **providing explicit support to female academics at junior level considering promotion** (Edinburgh and Glasgow) to **providing funds to cover childcare when staff are attending external conferences or training events** (Strathclyde and Aberdeen). A number of universities **provide support to staff returning from extended periods of leave.** These include the Academic Returners' Research Support Scheme at the University of Glasgow and mini-sabbaticals at the University of the Highlands and Islands. Some universities operate '**core hours**', meaning that meetings and seminars should take place when staff with external caring responsibilities or those who work part-time are normally at work. **Equality and diversity is an explicit part of the job roles of senior academics** at the Universities of Edinburgh and Glasgow, a welcome development as **embedding equality in senior roles was highlighted by many of those who responded to our call for evidence.**
19. **Many respondents to this review cited Athena SWAN as one of the main drivers of progress towards gender equality in the academic workforce.** Engagement with Athena SWAN demands greater buy-in from senior management, wider conversations about equality issues, more robust processes and better data collection. Some suggest that it is these data, laying bare the problems within departments and/or institutions, that has the greatest impact and is the major catalyst for change. For others, Athena SWAN has a role to play in focusing minds, setting expectations for gender parity, embedding equality across universities, and as a mechanism through which best practice can be shared. While there was clear, if not universal, support for Athena SWAN, **there was also clear consensus on the need for reform** (e.g. through a reduction in administrative burden).
20. The **Aurora leadership programme**, a women-only programme run by Advance HE, was cited as an example of good practice in using positive action for positive impact on equality.
21. The inquiry also presented overarching recommendations for next steps to improve gender inequality in the STEM workplace:

Business and industry

Part-time and flexible roles:

22. **The availability of high-quality part-time and flexible roles as standard was highlighted** [through stakeholder consultation] **as the development that would have the greatest impact on gender equality in the workplace.** While such flexibility is becoming more widespread among large corporations, Scotland's STEM industry has a high prevalence of SMEs which, although invested in the wellbeing of their staff, often find it more difficult to make flexible and part-time working successful.
23. However, even where flexible and part-time working, or other family-friendly policies such as enhanced maternity and shared parental leave offers, are available, those who take up these opportunities (women, disproportionately) frequently continue to face career penalties. Part-time work is considered less valuable: part-time employees experience a significant hourly pay penalty (on top of loss of income due to working fewer hours). Businesses continue to value and reward



presenteeism and availability outside core working hours, while pervasive cultural norms (in organisations and in society) stigmatise men taking on more caring responsibilities.

24. **The offer of high-quality flexible and part-time roles, therefore, must be supported by a rethink of merit and the value placed on more flexible contributions to the organisation.** Policies and processes should ensure that career breaks and flexible working patterns do not negatively impact development and progression opportunities. Senior management can remove stigma and lead culture change by acting as role models, normalising the uptake (by women and men) of progressive policies through their own behaviour, for example male leaders demonstrating they take on a greater share of responsibilities at home.

Unconscious bias training:

25. **There is a need to move away from standalone unconscious bias training to a comprehensive and on-going programme to develop gender competence among employees.**

Positive action measures:

26. Many of those involved in the drive towards gender parity suggest that **employers in Scotland, and the UK, must be more courageous in their use of positive action measures**, if we are to achieve a step change in the representation of women in STEM workplaces. This may include the development of returnship programmes as standard practice, the introduction of placements solely for undergraduate women to encourage them to remain in the sector, and investment in outreach and engagement with women and girls. Positive action measures must be developed as proportional responses to a strong evidence base for under-representation. To minimise the resistance to such measures, businesses must be clear that they do not amount to preferential treatment, but rather provide equality of opportunity and deliver universal benefits to both the business and to wider society.

SMEs:

27. **The benefits of improved equality and diversity have equal, if not greater, potential impact on small businesses.** In small teams, the performance of every individual has a significant effect on performance overall, and therefore small and medium enterprises (SMEs) may benefit most from access to the best talent; more innovation, creativity and flexibility; a corporate culture that promotes staff wellbeing (and productivity); and a positive external reputation. **A step change in SME engagement, however, calls for more strategic, targeted support.** For many small employers, the perception of action on equality as complicated, costly and burdensome, can only be overcome through dedicated, tailored intervention. With over 363,000 SMEs in Scotland, the size of the challenge is significant. For this reason, it is imperative that a strategic approach is taken to provide oversight on the numerous channels through which public agencies and third sector bodies (e.g., enterprise agencies, training providers, chambers of commerce, sector skills bodies) engage with SMEs, in order that support on equality and diversity is embedded within all activity.

Academia

28. Universities and departments must **examine the issues**, and the extent of disparities among staff, that are **present within their own institutions**. It is only when the causes of gender gaps are understood in situ that employers, working closely with staff and taking advice from equalities partners, can develop an appropriate suite of actions, policies and practices.

5. What are the impacts of COVID-19 on equity for STEM workers (including job and income security, contract type etc) in the short- and medium-term? Which communities, groups, organisations or sectors are being most impacted?

29. The above questions are among those being investigated by the RSE's Post-COVID-19 Futures Commission. Its remit includes an exploration of the specific impact COVID-19 has had on more



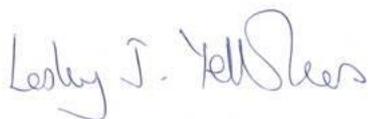
marginalised groups and finding ways to ensure their voices are heard and heeded in any discussions of post-pandemic remediation. The Commission tracks developments and impact on its microsite (<https://www.rsecovidcommission.org.uk/>) and we invite the APPG to engage with the work of the Commission as it progresses.

30. The RSE will be launching a Scottish Funding Council-funded call for academics experiencing COVID-19 related disadvantage and inequality, creating opportunities to carry out research in a unique, RSE-enabled peer support network. This opportunity complements the SFC's £75m 2020 Additional Research Fund by focusing on individuals rather than institutions and is uniquely open to those impacted within all career stages, disciplines and HEIs. Awardees will be able to restart or complete existing research, or kick-start new work. We would be pleased to flag this opportunity when it goes live and for the APPG to promote it across its networks to ensure it reaches as many prospective applicants as possible.

6. What are the implications and opportunities of new policies and employer action in the next 5-10 years following COVID-19 and Brexit? What will the future impacts be for communities, groups, organisations or sectors?

29. In addition to introducing new challenges, COVID-19 has illuminated many of the entrenched and systemic inequalities that continue to keep certain groups from achieving their full potential in the STEM workplace. Rather than simply undoing the damage that has been inflicted by the pandemic, the real challenge will be to move beyond our previous baseline towards a more equitable system that affords everyone the same opportunities for success. Scotland is fortunate to play host to an incredible pool of diverse STEM talent that could be mobilised to develop both immediate solutions and longer-term improvements to the way we live our lives. It is equally critical that future talent is properly nurtured, beginning at the earliest stages of life when children are still building their STEM capital³ and lasting through to key career progression points. Clearly the STEM sector is invaluable to post-COVID-19 recovery, but that momentum should be sustained even after the pandemic has subsided. We cannot afford to return to a position of complacency when it comes to safeguarding our economy against future global crises and addressing chronic social inequalities.
30. We look forward to seeing the outputs of the inquiry when they become available. We would also be pleased to engage further with the APPG on this topic in the future, perhaps in the form of a joint roundtable or other engagement work. To follow-up, please contact Daria Tuhtar, Policy Advice Officer, at dtuhtar@these.org.uk. Thank you and I wish you all the best as you conduct your inquiry.

Yours sincerely



Professor Lesley Yellowlees CBE HonFRSC FRSE

³ The Learned Societies' Group on Scottish STEM Education, of which the RSE is a member and of which I was formerly a Chair, has written about the importance of engendering STEM capital in young children in order to promote STEM ambitions later in life. https://www.rse.org.uk/wp-content/uploads/2019/05/Response_LSG_STEM_Experiences.pdf

