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Submission to the House of Lords debate on issues relating to women and science

- The positive contributions women have made to STEM are undeniable. Yet these achievements have taken place within a field that has historically excluded them. This document highlights the barriers that still persist today. By addressing and removing these obstacles, we can unlock extraordinary potential for groundbreaking research, innovation, and progress.
- Women continued to be paid less than male colleagues, in the UK, **pay is 19.8% below men's earnings**.[1]
- Women are evaluated more critically, less likely to be cited as author on an article or patent produced by their team and frequently receive less recognition for the same achievements as their male colleagues.[2]
- Scientific papers with female first authors spend more time in peer-review when compared to male counterparts.[3]
- In academia, women experience higher rates of harassment than their male counterparts, contributing to their intention pursue another career path.[4]
- Women in STEM can face the double bind of being perceived as too dominant or difficult when assertive and criticized as lacking leadership qualities when more collaborative and reserved making it impossible to fulfill expectations.

Burden of Caring Responsibilities

- Care responsibilities continue to be disproportionately assigned to women, limiting their time, mobility, and flexibility. Lack of childcare support is the most difficult for primary caregivers and single mothers. According to the National Childbirth Trust, families now spend an average of £7,000 per year on part-time nursery taking up considerable portion of annual budgets.[5]

International research stays, including conferences, training, and workshops, which are often important for career progression, can therefore be more difficult to attend.

- While some fellowships permit flexible working patterns which may alleviate complexity around caring responsibility, too few are awarded each year, for instance, only five Dorothy Hodgkin Fellowships[6] were awarded in 2024.[7]

Lack of Representation and Role Models

- From a young age, girls are less likely to want to pursue a career in STEM. Pertinently, 38.5% of girls 11-18 indicate an interest in an engineering career, compared to 62.5% of boys.[8]
- Lack of exposure to role models in media, toys, classrooms, and society impacts girls' ability to envision a future in STEM. This is further compounded by the general lack of representation of women in STEM.
- Although quotas have been proven effective to address gender gaps in employment, their impact can also be negative in making women feel underserving reducing self-esteem and confidence which ultimately discourages women from entering leadership positions in STEM.
- Many are motivated to pursue STEM careers during their undergraduate studies, but that interest often diminishes during their master's programs and can decline further during their PhD studies.
- Research shows that diverse groups and companies are better at solving complex problems,[9] are more resilient,[10] and have been found to generate 19% more revenue from new products and see 121% more patent citations.[11]
- Women can influence what questions are asked, which methods are prioritized, and whose experiences are considered relevant. For example, medical research historically centered male subjects, leading to gaps in knowledge about women's health. Without women, research groups may become more uniform and prone to groupthink, which weakens their problem-solving capacity and leads to less breakthrough research.

Intersectionality

- Queer scientists must also navigate fear of being open about their identity, hostile or exclusionary environment, and geographic mobility constraints due to legal risks in certain countries.
- Younger researchers may face precarity, short-term contracts, and power imbalances with more senior members of staff.
- Older researchers may encounter age bias, particularly in tech-driven innovation sectors or for grant and job application (application often allowed only for a limited number of years after PhD completion).
- Scientists with disabilities must navigate inaccessible labs, buildings, conferences, and digital infrastructure.
- Rigid productivity expectations do not accommodate neurodiversity, chronic illness and/or different working patterns.
- Women that have intersecting characteristics may face disproportionate challenges.

Any unreferenced material is shared from personal experience.

1. Women in STEM research shames UK, https://www.businessweekly.co.uk/posts/women-in-stem-research-shames-uk

2. Women are credited less in science than men, https://pmc.ncbi.nlm.nih.gov/articles/PMC9352587/

3. Women's Research Papers Spend Longer Under Peer Review Than Men's, https://www.the-scientist.com/women-s-research-papers-spend-longer-under-peer-review-than-men-s-74078

4. How harassment is depriving universities of talent: a national survey of STEM academics in the UK, https://ore.exeter.ac.uk/articles/journal_contribution/How_harassment_is_depriving_universities_of_talent_a_national_survey_of_STEM_academics_in_the_UK/29810768?file=56857025

5. Average Childcare Costs, https://www.nct.org.uk/information/life-parent/practicalities-being-parent/average-childcare-costs

6. Dorothy Hodgkin Fellowships are awarded by The Royal Society and are targeted at early-career scientists who require flexible working patterns due to personal circumstances including caring responsibilities and/or health conditions.

7. The Royal Society, https://royalsociety.org/news/2024/10/early-career-researchers-grants-announced/

8. Engineering UK: https://www.engineeringuk.com/research-and-insights/our-research-and-evaluation-reports/rapid-evidence-review-girls-aspirations/

9. Page, S.E, The difference: How the power of diversity creates better groups, firms, schools, and societies. https://psycnet.apa.org/record/2007-05886-000

10. Duchek et al., The role of diversity in organizational resilience: a theoretical framework. https://link.springer.com/article/10.1007/s40685-019-0084-8

11. The Academy of Engineering, https://raeng.org.uk/media/4mapcbqu/the-edi-engine-evidencing-the-business-benefits-of-equality-diversity-and-inclusion-edi-in-engineering.pdf