

## **The House of Commons Science and Technology Select Committee Inquiry into Women in STEM careers**

### **Evidence from the Russell Group of Universities**

#### **1. Summary**

- 1.1 The Russell Group represents 24 leading UK universities which are recognised internationally for their excellence in higher education and research in science, technology, engineering and mathematics (STEM). We are pleased to be able to submit evidence to the Committee on the important issue of women in STEM careers.
- 1.2 In the pursuit of academic excellence, equality and diversity for both staff and students are of considerable importance to Russell Group universities. The under-representation of women in academic STEM careers has been a matter of considerable attention by Russell Group universities for a number of years. Whilst the under-representation of women is not unique to universities, or their STEM departments, we are aware that the nature and organisation of academic science creates some additional obstacles to the participation and progression of women, which may not exist to the same extent in other professions.
- 1.3 The Russell Group educates around a third of the UK's STEM graduates. Male and female STEM graduates from our universities go on to careers in a very broad range of sectors in the UK and beyond. Our universities play a key role in supplying the highly skilled STEM graduates and postgraduates required by the economy.
- 1.4 Within the Russell Group, 53% of undergraduate students (across all subjects) are women. However, the picture varies between subjects. In maths, physical sciences, engineering and computer science fewer than 40% of Russell Group students are women. Moreover, within the population of students who progress to become postgraduate research students women are in the minority, representing 46% of all such students.
- 1.5 Women are under-represented at the highest levels of academic science both within the Russell Group, and across the wider HE sector. Amongst professors at Russell Group universities only 19% are female. The lowest proportions of female professors are in STEM subjects such as engineering and maths. However, the under-representation of women is not unique to STEM subjects – only 26% of professors in social studies, humanities and language based studies are women.
- 1.6 Russell Group universities have put in place a range of policies and activities designed to help women in STEM to overcome these obstacles. Initiatives include flexible working policies, programmes to support women returning from career breaks, mentoring schemes, tailored equality and diversity training, and leadership development programmes.

## 2. Why do numbers of women in STEM academic careers decline further up the career ladder?

- 2.1 While it is universally true that the numbers of women in STEM academic careers decline further up the career ladder, it should be noted that the points in the 'pipeline' which are critical for women's representation do vary from subject to subject. For example in psychology the 'pipeline leakage' is most acute in the transition from senior lecturer to professor and until this career point there is a very good representation of women. Whereas in the chemical sciences there is a steady decline in gender proportionality from undergraduate to professorial level, with a slight increase in the rate of 'leakage' at the point of going from PhD student to post-doctoral researcher<sup>1</sup>.
- 2.2 It is possible to categorise the reasons for underrepresentation of women in STEM academic careers into broadly three areas which are complex and interlinked. These three areas are:
- (a) issues particular to academia;
  - (b) issues particular to STEM, and;
  - (c) the gendered nature of work and family care in the UK.

### *Issues particular to academia*

- 2.3 **Fixed-term contracts:** Progression in an academic STEM career usually requires staff to move through a number of 'post-doctoral' positions. These positions are grant funded and tend to be fixed-term, or if the contract of employment is not fixed-term, the funds to support the position are only available for a limited time. There is evidence to suggest that fixed-term contracts are considered by women to be a particular barrier in relation to their careers and planning. The fact that they are normally held relatively early on in an academic career also increases the likelihood that a woman will have such a contract around the time when she may be starting a family.
- 2.4 **Long-hours culture:** Academia tends to be associated with long working hours in order to be perceived as 'achieving'. In addition it is common that meetings and seminar series are held outside of core working hours. As many women carry out most of the caring responsibilities their families, they are often unable to work as many additional hours as their male counterparts.
- 2.5 **Competitive work environment:** The lack of funding security is compounded by pressure to advance early in a career in a competitive environment, judged in research-intensive universities by applications for grant funding, maintaining a steady and high volume of publications and publishing scientific breakthroughs before colleagues. Women appear to find this early career pressure more of a deterrent to staying in academia than men do.<sup>2</sup>

### *Issues particular to STEM*

- 2.6 **Limited opportunities for part time working and job sharing:** Part-time work in academia remains relatively rare, whereas many competing employers, including the NHS, provide high status and well paid part-time roles. The lack of such obvious part-

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<sup>1</sup> International Journal of Gender, Science and Technology, Vol.3, No.3 *A Survey of Chemistry and Physics Postdoctoral Researchers' Experiences and Career Intentions* Jennifer Dyer and Sean McWhinnie. Institute of Physics, United Kingdom and Oxford Research and Policy, United Kingdom.

<sup>2</sup> <http://www.ieb.ub.edu/aplicacio/fixers/SM10Morin.pdf>

time opportunities in universities gives the impression that part-time working isn't possible or compatible with an academic career in STEM and women feel under pressure to return to work full-time. In addition, women often report feeling marginalised when working part-time or flexibly, and feel that they are perceived as not fully 'pulling their weight'.

- 2.7 **Career breaks:** Academic career structures and funding arrangements (particularly in STEM) do not readily accommodate career breaks, for example maternity leave. Career breaks tend to limit an individual's publication rate, which affects tenure reviews and grant applications. Also, during a career break, it is difficult to keep track of the developments and contacts in the individual's STEM field of expertise. If the career break takes place during a grant period, then it could negatively affect the annual performance on the grant and the ability to obtain new research grants. Variations in funding rules also mean that grants are not always able to be suspended when a researcher takes a period of maternity leave, and there are issues of whether research can be paused or covered during a researcher's leave.
- 2.8 **Expectation of mobility:** In some scientific careers, there is an expectation that people will move around at different stages in their training (e.g. for postdoctoral research training). When a woman is not single or has dependants, her geographical mobility to progress her career may be constrained more than that of a similarly-qualified male.
- 2.9 **Expectation of travel:** Similarly the ability to attend conferences and to collaborate both nationally and internationally are often seen as measures of success; as the main carer for children or other family members, many women do not have the necessary support mechanisms in place at home to enable frequent travel.
- 2.10 **Lack of female role models:** Having prominent and visible senior and successful women in different fields can have a positive effect not only on women, and also on the public's impression and the stereotypes around STEM and gender. Greater visibility of women taking lead research roles in STEM subjects, appearing publicly for example on expert panels and in the media, could lead to more women choosing to study STEM subjects, and to pursue an academic STEM career.
- 2.11 **Lack of female mentors:** Senior male academics may be more likely to offer sponsorship to young male early career researchers who, unconsciously, remind them of themselves at an earlier stage in their career, while women may not as frequently be afforded the same informal support and encouragement.
- 2.12 **Gender biases:** Unconscious or conscious biases could also be a factor affecting the representation of women in STEM. For example, there have been several studies looking at the biases of interview panels, and the peer review process.<sup>3</sup> Gendered assumptions about men and women's strengths and weaknesses can also lead to women being given 'pastoral' roles within departments, such as teaching and student support roles. This often means that men have more time to focus on research activities – which are more likely to lead to a promotion. The biases described above have implications for the recognition of women - where there may be a need for women to 'outperform' men to gain appropriate recognition.

### ***Issues relating to the gendered nature of the work and family in the UK***

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<sup>3</sup> Moss-Racusin, C. A. et. al. 2012. Science Faculty's subtle gender biases favour male students. *PNAS*. 109(41) pp. 16474–16479, Wenneras, C. and Wold, A. 1997. Nepotism and sexism in peer-review. *Nature*, 387. Pp.241-343.

- 2.13 Some of the potential obstacles identified above will be faced by women whether or not they have child caring responsibilities. However, many are strongly linked to the wider social issue that childcare in the UK remains largely gendered.
- 2.14 Despite recent legislative changes, shared parental leave is unusual. Women take relatively long periods of maternity leave and men usually take a maximum of two weeks of statutory paternity leave.
- 2.15 In addition a large proportion of women continue to take the primary responsibility for child care, beyond the early years. Women are also more likely to take responsibility for caring for elderly relatives.

### **3. When women leave academia, what careers do they transition into? What are the consequences of scientifically trained women applying their skills in different employment sectors?**

- 3.1 While some good work is being done to monitor the destinations of women leaving academia, there is not currently a strong evidence base on this issue. The consequences of women moving into STEM or non-STEM careers away from academia are wide-ranging, and can be positive for the individual and for the new employer and sector. Scientifically trained women who leave academia are unlikely to be lost to productive employment but to make important contributions to the educational, social, business and economic good of the country. However, for universities, this results in a loss of key skills and contributes to the under-representation of women in senior STEM roles in universities.

### **4. What should universities and the higher education sector do to retain women graduates and PhD students in academic careers?**

- 4.1 Over a number of years Russell Group members have identified a range of ways in which universities can take action to support the retention and progression of women in STEM careers. Common themes include:
  - (a) Efforts to ensure ongoing progressive culture change and the embedding of equality and diversity in all areas of work within the university;
  - (b) Support for career progression, particularly at key transition points such as the transition between PhD, post-doctoral and lectureship posts;
  - (c) Proactively ensuring that women are invited to apply for positions and ensure female representation on interview panels where possible;
  - (d) Establishing and funding leadership development programmes and careers advice services;
  - (e) Increasing opportunities for mentoring and networking for women;
  - (f) Offering more flexible and family friendly working practices for both women and men;
  - (g) Undertaking awareness raising of gender equality issues and effectively communicating existing policies and practices;
  - (h) Committing to reviewing and publishing information on equal pay;
  - (i) Undertaking external-facing initiatives to engage and retain women in STEM careers;

- (j) Undertaking 'early intervention' activities with girls and young women to engage and retain women earlier in the STEM 'pipeline'.

## 5. Are there examples of good practice?

5.1 Russell Group universities are leading contributors to national schemes aimed at increasing the number of women succeeding in academic STEM careers. All Russell Group universities (with the obvious exception of the LSE) are members of the Athena SWAN Charter. Nineteen Russell Group universities currently hold Bronze level awards and four hold Silver. These awards recognise the commitment and work underway at all levels within Russell Group universities to address gender inequalities.

5.2 There is a wealth of initiatives undertaken by individual Russell Group institutions aimed at addressing the barriers facing women in STEM careers. A summary of some institution-specific examples of good practice is provided below. These are by no means exhaustive, and do not attempt to reflect all the activities of every Russell Group institution.

5.3 Examples of good practice in flexible and **family friendly working policies**:

- (a) At the University of Cambridge flexible working opportunities include part time work, job sharing and condensed hours
- (b) At University College London paternity leave has been extended to 4 weeks (20 days) paid leave
- (c) At the University of Manchester women returning from maternity leave are offered a 6 month period in which they are relieved of teaching duties so that they can focus on their research work.
- (d) At Queen's University Belfast and the University of Oxford the Schools hold their key meetings during core hours.
- (e) At Queen's University Belfast female researchers going on maternity leave are able to place their research grants in abeyance, and the institution shoulders the cost of replacement researchers for the duration of the maternity leave.
- (f) Cardiff University also provides dedicated support for women returners from maternity with protected time to focus on research.
- (g) The University of Oxford's nursery provision has doubled over the last two years. The University has 429 childcare places across 12 sites, plus four college nurseries. It offers a salary sacrifice scheme for payment of nursery fees, a childcare voucher scheme, and works in partnership with external providers to support parents during the school holiday periods.
- (h) Imperial College London provides high quality in-house childcare through its Early Years Education Centre, which has been rated as 'outstanding' by Ofsted. It also provides a childcare support scheme by providing a £124 per month tax free sum to each parent of a child under five

5.4 Examples of good practice in **equality and diversity training**:

- (a) At Imperial College London, University of Manchester and UCL unconscious bias training is being rolled out to managers and departmental staff
- (b) At UCL anyone who sits on a recruitment panel must first attend a fair recruitment briefing.
- (c) At Cardiff there is mandatory equality and diversity training for all staff including training for all chairs of interview panels.

## 5.5 Examples of good practice in **networking and mentoring**:

- (a) Newcastle University and Durham University are currently developing a sustainable cross-institutional network to support women in academia. The project aims to share good practice and make internal events available to women at both institutions, launch a cross-institutional coaching and mentoring network for female academics, and hold a two day conference about women working in higher education.
- (b) Imperial College London has established a 'babies and bumps' staff networking group to allow parents and expectant parents an opportunity to network and socialise.
- (c) Oxford University has established Oxford Females in Engineering, Science and Technology (OxFEST) - a student-led society with 800 members that aims to provide a support network for all women in science at Oxford. Mentoring and networking opportunities are provided through: regular speaker events, socials and skills development sessions, a mentoring scheme open to all members, an annual Symposium and a Facebook page and website.
- (d) The University of Manchester has strong network groups for staff and students, including a Peer Support Group for Women Returning from Maternity Leave, International Staff Network Group and Women in Science, Engineering and Technology. The groups organise events throughout the year and the university allows members up to eight hours per year to be dedicated to network group activities from their standard working hours.
- (e) Cardiff University has a women's mentoring scheme and a dedicated STEM Schools mentoring programme.

## 5.6 Examples of good practice of initiatives to **create an inclusive culture where women feel supported and their achievements are celebrated**:

- (a) At Newcastle University the Career Pathways Framework for Research Staff sets out an aspirational framework to assist research staff in planning their career development activities to support their future career aspirations, is being implemented in the Faculties of Medical Sciences and Science, Agriculture and Engineering. The Career Pathways Scheme comprises timely interventions and the option for a career pathways review with an independent adviser.
- (b) Cardiff University offers confidence building for female academics and promotion workshops.
- (c) At Imperial College London an annual Athena Lecture is held in which a female academic, who may be internal or external to the College, is invited to speak about her career, life and achievements.
- (d) At Newcastle University the Vice-Chancellor holds 'Celebrating Success' events three times a year.
- (e) The University of Cambridge promotes women in the sciences in a number of ways, including provision of a high number of visible female role models via local and national outreach and science communication initiatives, such as Soapbox Science, and STEMnet.<sup>4</sup>

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<sup>4</sup> <http://soapboxscience.org/>; <http://www.stemnet.org.uk/>

**6. What role should the Government have in encouraging the retention of women in academic STEM careers?**

- 6.1 National policies aimed at making childcare more affordable could have a positive impact on the representation of women in STEM academic careers.
- 6.2 The Government could work with research councils and other funders to standardize the rules regarding researchers taking and returning from maternity leave.
- 6.3 There is also a role for government in providing positive recognition of universities which are being particularly active in addressing gender inequalities, both in STEM and across academia more broadly, and in disseminating good practice.
- 6.4 The collection of national level statistics on women studying STEM subjects, progressing through academic STEM careers, and those who leave academia for other sectors would be useful.
- 6.5 In some STEM subjects the issue remains one of entry to science. This will continue to require sustained action in schools.
- 6.6 The protection and enhancement of overall research funding is critical. One of the frequent concerns expressed by mid-career scientists is the difficulty in obtaining funding for their work.

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