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Addressing gender inequality will help to strengthen ARVO

If I lived in the Northern Hemisphere, "Scientists" is an exhibition I would not miss. The exhibition — currently showing at The Royal Society in London — features portraits and drawings of Fellows and other awardees of the world's oldest scientific academy. The unusual feature of this exhibition is that all the featured scientists are female.

In a science blog published on the website of *The Guardian* ahead of the opening Uta Frith[1], a Fellow of The Royal Society and curator of the exhibition, comments, "Women in science have an image problem." She explains that the problem is one of "invisibility," and while she seeks to fill "a void in representations of women in science," "Scientists" is also intended to encourage women's involvement within science in a broad sense. This is certainly a laudable goal.

The topic of women in eye and vision research was featured in many of my discussions during and after the ARVO 2013 Annual Meeting, at forums ranging from the Board of Trustees meeting to informal "chats" in the poster hall to post-meeting electronic feedback. Such discussions are not peculiar to ARVO, of course. The involvement of women across all fields of science is receiving considerable attention at the present time, in the popular press and scientific literature, and at educational and academic, business and industrial, and political events. This attention is very appropriate.

In March 2013, *Nature* dedicated an issue of the journal to Women in Science, and the issue made for rather shocking reading. Clearly times have moved ahead since my mother was considered unsuitable for postgraduate training by senior academic faculty, because she was married and had small children. However, as highlighted by the articles in this issue, there continues to be substantial discrimination against women in science. Examining current statistics, *Nature* Journalist Helen Shen[2] notes that although women are awarded approximately half of the doctorates in the U.S. and Europe, there is a progressive decline in female representation at increasing postdoctoral levels, with women accounting for approximately 10 – 20% of senior faculty in different scientific disciplines. Women are underrepresented on peer-review bodies such as scientific review panels for granting bodies and journal editorial boards. Statistics generated in the United States suggest that while women are as successful as men in terms of securing research grants today, sizes of their awards are relatively smaller. Additionally, as a group, female scientists earn lower salaries than their male colleagues.

Some women leave careers in science due to family related responsibilities. Like many institutions across the globe, the Australian university where I am based has enacted many policies that allow one to balance work and family life, including onsite childcare, allowance for changes in employment fraction and/or part-time work, and flexible working hours. The concept of "performance relative to opportunity," considering career interruptions due to child or other family care-related responsibilities and illness, has been embraced by federal granting bodies in Australia and many other countries.

However, as highlighted in her commentary, *Sexist attitudes: Most of us are biased*, the neurobiologist Jennifer Raymond, PhD[3], cites multiple pieces of evidence for a widespread bias against women in science, which is promoted by men and women alike. A particularly illuminating study was published recently in *Proceedings of the National Academy of Sciences of the United States of America*[4]. In a randomized double-blind study, two resumes that were identical save for the names – male or female – were provided to science faculty at six U.S.-based research-intensive universities. Participants were asked to consider the two candidates for a laboratory manager position. Both female and male faculty rated the female candidate as having significantly less competence and hireablity, and suggested a significantly lower salary for the female applicant, in comparison to the male applicant.

This leads to the question of how women fare at ARVO. Our membership statistics are consistent with those for the field of science in general; 48% of members-in-training are female, while 31% of the more senior membership are female. Achievements in addressing gender inequality at ARVO are apparent. In 2014, the Board of Trustees has a record number of female trustees — five females and 11 males — and in myself, ARVO has its fourth female president. At the 2013 Annual Meeting, 34% of paper session chairs were female. The ARVO Foundation

for Eye Research's Women in Eye and Vision Research (WEAVR) initiative has been highly successful in promoting the career paths of women in eye and vision research; activities include networking opportunities and travel grants to support female scientists' attendance at the Annual Meeting.

However, concerns regarding gender inequality remain, as a few examples illustrate. Although the ARVO membership includes many highly accomplished female scientists, over the past 15 years, women have received just 10% of ARVO Achievement Awards for scientific contributions (i.e., Proctor Medal, Friedenwald Award, Mildred Weisenfeld Award and Cogan Award). The Keynote Series became part of the Annual Meeting in 2000; a female keynote speaker is yet to be programmed. Women make up over one-third of the large editorial board of *Investigative Ophthalmology & Visual Science*, but just one of the eight associate editors is female.

How to correct gender inequality in science most effectively remains a big question that I will not attempt to address. There are arguments for and against quota systems, which require a specific number of women be appointed or selected for particular roles or awards. As members of ARVO, we should be proud of the efforts our organization has made to address gender inequality, but we also should look forward to further movement. Such equality will only strengthen ARVO's leadership in the eye and vision research community. ■

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