



EMPOWERING WOMEN IN STEM

Even though women now hold senior positions in STEM fields, many of them still battle sex discrimination when trying to climb the ladder. In this second of a two-part interview, **NSERC CWSE** Drs Tamara Franz-Odendaal, Catherine Mavriplis and Annemieke Farenhorst explain that while of course initiatives to bolster the amount of women in STEM careers are needed, real change requires greater support in the workplace and a shift in the way society and cultures view women who choose to work in STEM fields

Drs Tamara Franz–Odendaal, Catherine Mavriplis and Annemieke Farenhorst

Natural Sciences and Engineering Research Council of Canada Chairs for Women in Science and Engineering



Could you begin by explaining why the Natural Sciences and Engineering Research Council of Canada (NSERC) Chairs for Women in Science and Engineering Program (CWSE) was initially set up and how it has developed over the past year?

TFO, CM, AF: The CWSE programme was set up to address the low numbers of women in science, engineering and technology sectors. To do this, work at all levels is needed. This includes engaging girls in school, supporting female professionals in STEM careers and working to change the workplace environment. Currently, although women make up 48 per cent of the labour workforce in Canada, less than 22 per cent are employed as professionals in STEM fields. Women occupy 81 per cent of administrative positions in Canada, and these are often low paying or part-time positions.

When we interviewed you in 2012, you briefly mentioned that the number of women leaving STEM careers cannot simply be attributed to the oft-cited decision to have a family, but may be due in part to frustration with the narrowness of the field. Could you elaborate on this? How can science careers adapt to become a more attractive prospect for women?

TFO: It is not the careers that have to adapt but rather society's views of these careers. We need a societal shift. We need parents, grandparents, teachers and peers to be more supportive of women choosing careers in science, engineering and technology; as well as trades. These are excellent careers that will enable women to become economically independent in their futures. We also need the workplace environment to become more supportive of women; and for more of them to be recognised and mentored into leadership positions within STEM workplaces.

CM: As documented by Anne Preston's study of over 1,500 men and women in science in her book *Leaving Science: Occupational Exit from Scientific Careers*, many women feel that their breadth of talents are not being used to the fullest capacities in their science careers, and they also feel a frustration with the other scientists they work with who do not value a broader set of competencies. These feelings often set in after several years in the field, for those who have persisted through the various hoops and gates in the first place. On the other hand, this may seem to counter the desirable attributes of soft and/or people skills that many women could bring to management positions. The work environment for these women is often so male-dominated and entrenched (due to historical reasons) that the very definition of desirable attributes is a perception issue that is hard to change.

The work environment could therefore benefit from some awareness of the issues and perceptions that confront these professionals. In my own CWSE programme, we have approached some of the issues with a discussion of 'cultural diversity' rather than 'gender diversity' as a multicultural society (such as in Montreal and Toronto) and workforce at the sponsoring company Pratt & Whitney Canada who are more open to and familiar with these issues.

A little humour injection also goes a long way to opening up the discussion.

AF: Research has shown that women are less valued than men in the workforce. One recent example is a 2012 study in which a student resume

was sent to scientists at academic institutions. Half of the scientists received the resume with a female name, and the other half were given the same resume but with a male name. The results showed that females were rated lower in their experiences and competencies and were offered significantly lower salaries than their equivalent male peers. Scientists were also less likely to show interest in mentoring females. Both male and female scientists showed the same gender discrimination towards female students. These study results are very concerning. We need to create a better dialogue to address the negative stereotyping that exists for women in the workforce at all levels.

Sexual harassment remains a concern for many of the women I have spoken to. A greater dialogue within academic institutions and other organisations about sexual harassment remains extremely important, along with true action and support networks for creating safer workplace environments for women.

Would you say that there is a great disparity between different regions in Canada in terms of working practices and opportunities for women in STEM? How can such gaps be improved?

TFO: Not really, but there is a great disparity amongst different cultures within Canada. This requires different programming strategies that recognise the nuances and beliefs of each culture so that we can engage and connect with girls and women across cultures (and hence the country).

CM: From my own experience, there is not much difference between Ontario and Quebec other than language issues and some cultural issues. We do hear of some more difficult situations for women in more rural or smaller communities, eg. the Maritimes.

AF: I believe women in different regions in Canada are experiencing the same challenges. Some provinces may be in a better position to address these challenges, because, for example, they have greater financial resources, or they have more political will to devote time and energy to promoting equity in the workforce.

How would you rate the position of women in STEM in Canada against the international picture? What can be learned from other countries, and what insights might they gain from Canada?

TFO: There are certainly lessons to be learnt and it is a good idea to study countries that have succeeded in attracting women into STEM fields. The main barrier is that we don't have enough people with enough time to address these issues. Even the NSERC CWSE programme, although it is an excellent programme that does tremendous work, only consists of five Chairs working part-time on these issues; this is for the entire country, which is geographically very large.

CM: I generally find the position of women in STEM in Canada fairly favourable as we are an educated society, very multicultural and hence open to difference and respectful of women. However, our numbers are no better than the US or other western nations. Certainly, the US has invested more, in particular, through the US National Science Foundation ADVANCE Program, to address the problem and target a transformation of the environment rather than

helping individual women one at a time. NSERC's programme for Canada is small by comparison, but each of the CWSEs has followed the trend to address awareness and climate issues in their own programmes. In Europe, some programmes have been well funded at times, however, it is difficult for us to judge their overall progress. It seems to me that there are some very advanced areas whereas others remain very conservative.

AF: Recently, the Gender Dimension in STEM fields was investigated for universities across Canada and a report was produced. It showed that Canada like the USA and Europe has fewer women the higher the academic rank. Of course there are many different countries within the EU and there is some variability there. I have read that countries like Finland and Sweden may be performing better than others when it comes to women in higher positions.

Did you see the European Commission's controversial 'Science: it's a girl thing!' video, which was released and quickly pulled last year? If so, what were your thoughts on the content of the video? How might they have produced a more effective campaign?

TFO: Yes. The NSERC Chairs network posted a response to the video on our websites at the time. Women in science and engineering take on some of the world's biggest challenges and selling science in the way that the video did feeds the media hyper-sexualisation of our society. We need to acknowledge and appreciate that all types of people can have science and engineering careers. We need to work hard to break existing stereotypes, and blunders like this video do not help the great work that many organisations, including the European Commission, are conducting to change society's view of women in science and engineering fields.

CM: The video didn't upset me as much as it did for many others. I thought it was in poor taste, but could have been aimed at a certain age group for whom they thought it would work well. Again, it's hard to tell what the culture is in other countries. There are certainly many different groups we aim to recruit to the STEM fields and a variety of approaches will be most effective. There is not one single type of female we will attract. Although some women are opposed to citing STEM as fields that serve society (because they feel it appeals to a stereotype that females are more interested in serving others), I do believe that, in order to reach more significant numbers, ie. a critical mass, such an approach is needed. I believe this could be particularly effective in IT or Computing, as it has been shown to be in environmental and biomedical fields.

AF: The video was appalling, particularly the scene in which the older male scientist was looking at the dancing girls. My 14-year-old daughter thought it was an awful video and wouldn't encourage her to go into science. I can think of better approaches to promoting science to girls.

What key strategies do you think would really make a difference to recruiting and retaining women in science?

TFO: I think if outreach activities were more supported by institutions and research councils there would be more exposure to the myriad of science careers for youth. Currently, outreach conducted by faculty is considered an extra service and not valued. The situation in industry is similar, employers should make time to engage youth. Then we need to address the workplace environment with policies that are supportive of re-entry into professions (after having a family) and also that are supportive of family demands.



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