



Women in Physics in Canada: Progress and Shortcomings

Janis McKenna¹, Maria Kilfoil², Adriana Predoi-Cross³, Michael Steinitz⁴

¹University of British Columbia, Vancouver, BC ²McGill University, Montreal, PQ ³University of Lethbridge, Lethbridge, AB ⁴St. Francis Xavier University, Antigonish, NS CANADA

In the past decade, significant progress has been made in attracting and retaining women in physics in Canada. The fraction of women at all stages in the pipeline, from undergraduate students to tenured faculty, has increased dramatically - yet we remain far from a situation in which half of all physicists in Canada are women.

In several other similarly demanding professions, this discrepancy between men and women is greatly diminished, or non-existent: for example in Canada, the majority of medical students (59%) are women¹. Slightly over half of all law students in Canada are women, and even the Supreme Court of Canada is led by a female Chief Justice; 4 of the 9 judges of the Supreme Court of Canada are women. Have women in those professions figured out something we have yet to learn? What are we doing wrong in physics, where only 22% of undergraduate students are women and 8% of faculty and 5% of tenured faculty are women²? Progress is slow!

Three issues have been targeted as areas in which progress in Canada has been made, and further improvements are sought.

They are: 1) outreach 2) dual career couples 3) balancing family and career

Outreach

Canadian girls will often develop interest in science and physics during or before secondary school. We scientists in academia and industry must help provide the opportunity and encouragement of hands-on learning in the study physics, math and science in the public school system. Girls tend to enjoy and benefit more from interdisciplinary programs in which courses such as computer science and physics are related to girls' interests in subjects including, arts, the environment, and health. We must explore and promote such programs. We must invest in scientific and technological literacy, provide and develop resources with and for teachers, and encourage parents to nurture and promote their daughters' interests in science.

We need to develop and support a commitment to advancing girls and women in science in Canada, beginning in kindergarten, and continuing throughout their careers. Industry and academia must recognize and support mentoring programs and provide role models for young women.

Several provinces, in particular Alberta, support a number of very successful outreach programs. Sharing information and helping the rest of the country benefit from the work and findings of successful outreach groups would benefit everyone.

Our national funding agencies provide relatively little funding for outreach efforts. We should encourage CAP and our funding agencies to consider following examples of other countries, such as the USA, in requiring outreach components in most scientific grant proposals.

Dual Career Couples

In recent years there has been an increased enrollment of women in physics graduate programs in Canada.² One would expect the increased pool of women PhD physicists to result in an according increase in the numbers of women in the physics workforce, in academics, industry and government laboratories. However, more than half of married women physicists are married to physicists or other PhD scientists, and securing two appropriate jobs in the same geographical region can be a challenge.³

The "two-body" problem is challenging. Candidates may reject an offer of employment or leave a job if a spouse does not eventually obtain satisfactory employment.

Becoming more widespread in Canada are:

a) **Academic institutions that have no university-wide policies to solve the problem but are willing to solve it on a case-by-case basis.** Solving the "two-body" problem in such institutions depends on the partner's field and qualifications, and on the availability of positions. If an institution chooses to offer two positions to a couple, it may be that one offer is a permanent position, while the other is a term, part-time or "soft money" position. Promises and indications made at the time of hiring for a second full-time or tenure-track position may be unfulfilled for years. The "trailing spouse" may end up under-employed and dissatisfied.

The University Faculty Awards (UFA) program of the Natural Sciences and Engineering Research Council (NSERC) of Canada may provide sufficient incentive for the university to offer a position to a woman or aboriginal physicist. Canadian universities have hired 19 women physicists into tenure-track positions with the aid of this UFA program (and its predecessor WFA program) since 1991.

b) **Academic institutions that have implemented a spousal hiring program.** Universities that have spousal hiring programs may arrange a spousal/partner hire as faculty or academic staff, or they may enlist a local "head-hunter" to help the spouse find suitable employment in the same geographical vicinity. Institutions sometimes offer the option of a "shared" or "split" position, which may be attractive for those with young families.

While considerable progress has been made since the era when anti-nepotism policies prevented the hiring of a couple, the issue of dual career couples continues to present a formidable obstacle to women in physics.

The Canadian team at this conference hopes to gain insight from experiences elsewhere with these issues and other barriers to increasing the representation of women in physics in Canada

Balancing Family and Career

For women, the crucial years for finishing postdoctoral work, establishing a physics career and seeking tenure usually coincide with peak childbearing years. While childbearing is an issue affecting both men and women, in Canada women tend to bear the brunt of family, childcare and eldercare responsibilities.

The demands of a career in physics sometimes preclude women from marrying and having children. The careers of women with children may stall or progress much slower than those of men, or women without children. On the positive side, the support of their families, including parents and partners, often contribute to the success and satisfaction of women in their careers. Several programs assist in balancing family and career for women in physics in Canada:

a) **Paid parental leave:** Paid family leave benefits⁴ are part of the Canadian unemployment insurance system and may be taken by either parent, for a newborn or adopted child for anyone with a permanent job in academia, industry or government.

b) **Paid parental leave for students and postdocs:** NSERC, the primary funding agency for academic physicists, may assist in making available paid maternity leave for graduate students and postdoctoral researchers. Such a paid maternity leave for can eliminate career gaps which tend to have a detrimental effect on securing a subsequent position or job.

c) **Compassionate Care Leave.** The Canadian family leave program offers paid Compassion Leave for people who must be absent from work to care for a gravely ill family member (elderly parents, family members and common-law partners of either sex are included, so this is not just parents and babies.) Again, it's law.⁵

d) **On-campus Child-care** Many Canadian universities have realized that high-quality on-site high quality child-care is an asset in attracting and retaining faculty, as well as serving the university community. But most Canadian universities have insufficient capacity to fill the campus community's childcare needs, resulting in wait-lists hundreds long. Additionally, the cost of on campus daycare often stretches the financial capacities of young faculty, particularly those with two or more preschool children. The cost and availability of childcare lags behind some European countries.

e) **Pause of the Tenure Clock.** Many, but not all, Canadian universities have policies by which the pre-tenure period may be extended, typically by one year per pregnancy.

Balancing a family and career is not easy for anyone, and in particular, not for academics or physicists. Even though a number of universities have programs, leaves, and flexibility of teaching duties in place for parents, balancing the demands of a university/governmental/industrial research position and a family can be challenging.

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