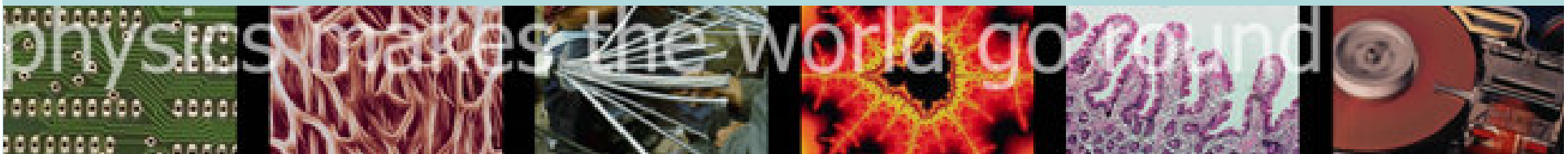




Progress and Challenges for Canadian Women Physicists

Adriana Predoi-Cross

Department of Physics and Astronomy, University of Lethbridge,
Lethbridge, AB, Canada
and
Canadian Association of Physicists





What is Canadian Association of Physicists (CAP) and what it can do for women in physics

- At the national level, the overall climate for women physicists both in academia and industry has improved significantly over the past decade. Organizations such as the CAP and the Canadian Association of University Teachers (CAUT) *are actively working towards minimizing the socio-economic* and professional gaps between women and men.
 - The CAUT also works toward ensuring that women in academia, all professional levels, are offered opportunities on par with their male colleagues.
 - The CAP supports and serves as a catalyst, bringing together men and women to discuss and address issues concerning women in physics across Canada.



The CAP Committee to Encourage Women in Physics (CEWIP)

- CEWIP was initiated in 1983 and is composed of both men and women
- It has been involved in many activities, including, among other things:
 - works to present positive images of physics and physicists to counteract the negative stereotypes prevalent in popular culture
 - organizing panel discussions on programs that encourage female physicists in Canada and a plenary session at the CAP annual congress
 - proposing female speakers for the CAP Lecture Tour
 - producing a directory of women in physics in Canada
 - organizes delegations to attend the International Conferences on Women in Physics

..... for more details please see www.cap.ca



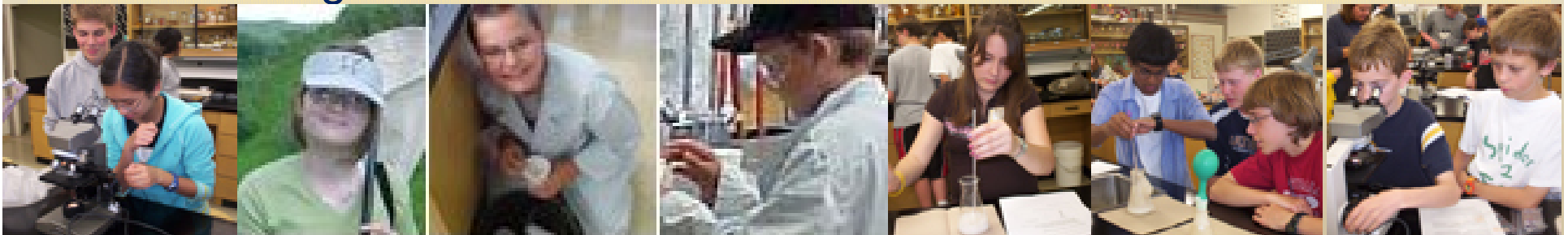
Professional Participation Rates

- CAP, through its activities, encourages universities to revise physics curricula and programs to include interdisciplinary studies or combined honors /dual majors (e.g. medical physics, biophysics, environmental physics...) which often encourage the participation of women.
- In recent years several Canadian Physics Departments have conducted an *external critical assessment of the climate and environment for women in their physics departments*.
 - often significant progress has been made in developing a friendly, open, invigorating, and welcoming climate towards women colleagues
 - several large universities' physics departments have made great strides and have four or more female faculty members
 - across the country, there is a diminishing number of physics departments with no women faculty members



Early physics education

- Canadian academic institutions and non-profit organizations are making efforts to generate interest in science and physics at an early age, preferably before secondary school.
- Some programs run year round, while others are structured as girls-only summer camps.
- Activities are carefully selected to ensure that the participants have a variety of opportunities to help them:
 - to see the connections between science and everyday life
 - to help the participants to gain confidence in their science achievement
 - to encourage their enrollment in future science courses.





Attracting Girls to Physics

- The *Canadian Association for Girls in Science* is an example of an organization with chapters across the country which foster early scientific literacy through a variety of diverse, fun activities such as “*the physics of music*”, or “*the chemistry of cooking*”.
- The *Techsploration* program in Nova Scotia, the *Ms.Infinity* and *Quantum Leaps* programs run by the Society for Canadian Women in Science and Technology in British Columbia are other examples of mentoring and networking programs which stimulate young women’s interests in science.





Early physics education

- Academic units and organizations across Canada also support local schools in their efforts to attract girls to physics through a variety of outreach programs such as **Science Fairs**
- In Alberta, over **60%** of participants in local high school science fairs are girls; in British Columbia, **52%** are girls
- **Physics Olympics** for High School students take place in several Canadian provinces - in British Columbia, typically 80 high schools (over 600 students - girls and boys) participate in annual Physics Olympics
- **Girls are interested in science**, and it is up to all of us to design activities to generate and maintain their interest in physics, and in science in general





The “*Maternal Wall*” in Canadian Academia

- Highly educated Canadian women may not encounter gender discrimination until they encounter the so called “*maternal wall*” which hinders advancement in their professional careers
 - professional mothers simply are unable to find the overtime hours that are often both expected and required for advancement and success in their professions
 - professional mothers may find themselves “*mommy-tracked*” both financially and on the professional advancement scale, with respect to their male counterparts
 - the pay gap between young or middle-aged mothers and women of the same age who have no children is now larger than the wage gap between men and women from the same age group
 - organizations such as the *Association for Research on Mothering founded in Toronto at York University*, are making efforts to find strategies to help mothers cope with the “*maternal wall*” in academia.



Dual Career Couples or “the two-body problem”

- Recent years have been marked by steady increased enrollment of women in physics graduate programs in Canada
- However, we do **not** observe an increase at the same rate in the numbers of women in the physics workforce, in academics, industry and government laboratories.
- **Possible reason:** more than half of married women physicists are married to physicists or other Ph.D. scientists, and securing two appropriate jobs in the same geographical region can be a challenge.
- Candidates of either sex may reject an offer or leave a job if their spouse does not eventually obtain satisfactory employment.



Dual Career Couples or “the two-body problem”

Canadian attempts to solve this problem:

- Academic institutions that have **no university-wide policies** to solve the problem but are willing to solve it on a **case-by-case** base
 - The success rate depends on the partner's field and qualifications, and on the availability of openings at the institution
 - 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



Dual Career Couples or “the two-body problem”

Canadian attempts to solve this problem (continued):

- **The University Faculty Awards (UFA) program of National Sciences and Engineering Research Council (NSERC) of Canada**
 - Run during 1991 to 2009 (including its predecessor WFA)
 - 5 year program
 - Provided incentives to universities to offer a position to a woman or minority physicist
- **Chairs for Women in Science and Engineering Program**
 - Funded in 1996
 - 5 year program (renewable once)



Dual Career Couples or “the two-body problem”

Canadian attempts to solve this problem (continued):

- **Academic institutions that have implemented a spousal hiring program**
 - 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
 - sometimes offer the option of a “**shared**” or “**split**” position, which may be attractive for those with young families



Balancing Family and a Career

Several programs assist in balancing family and career for women in physics in Canada:

- **Paid parental leave benefits**

- 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

- **Paid parental leave for students and postdocs**

- NSERC may assist in making available paid maternity leave for graduate students and postdoctoral researchers
- can eliminate career gaps which tend to have a detrimental effect on securing a subsequent position or job



Balancing Family and a Career

Several programs assist in balancing family and career for women in physics in Canada:

- **Compassionate Care Leave**

- for people who must be absent from work to care for a gravely ill family member

- **On-campus Child-care**

- most Canadian universities have insufficient capacity to fill the campus community's childcare needs, resulting in wait-lists hundreds long

- **Pause of the Tenure Clock**

- many, but not all, Canadian universities have policies by which faculty may extend the pre-tenure period, typically by one year per pregnancy

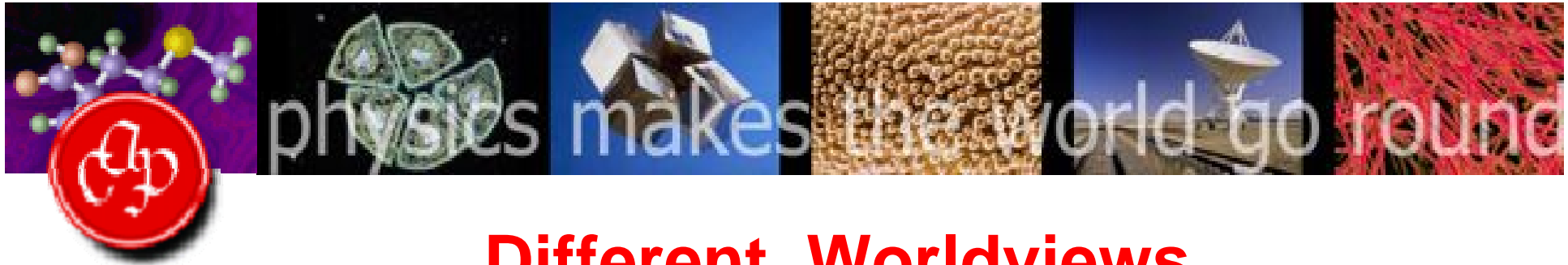


Conclusion

- In recent years there has been an increase in the number of women in all academic levels in physical and applied sciences in Canada
- The fraction of women at all stages in the pipeline, from undergraduate students to tenured faculty, continues to increase in physics, but progress is slow
- At the national level, the overall climate for women physicists both in academia and industry has improved significantly over the past decade

References

1. Canadian Association of University Teachers Almanac of Post-Secondary Education in Canada, 2008
2. Marie D'lorio, Janis McKenna, Ann McMillan, Eric Svensson, in *Physics in Canada*, 53, no.6, 263-269. (2002)
3. J. Lagowski, Janis McKenna, *Physics in Canada*, 52, no.2, 106-112. (1996)
4. Maria Kilfoil, Janis McKenna, Adriana Predoi-Cross, Michael Steinitz, in *Women in Physics in Canada: Progress and Shortcomings*, in *Women in Physics: Proceedings of the 2nd IUPAP International Conference on Women in Physics*, AIP Conference Proceedings, vol. 795, 2005.
5. A. Predoi-Cross, R. Austin, S. Bhadra, J. McKenna, L.-H. Xu, Michael Steinitz, *Women Physicists in Canada*, Physics in Canada, October 2008.
6. Human Resources Development Canada: http://www.hrsdc.gc.ca/en/labour/employment_standards/
7. Statistics Canada: *Perspectives on Labour and Income - Health Care Professionals, December 2003*, 75-001-XIE.
8. Andrea O'Reilly, *Rocking the Cradle*, Toronto: Demeter Press, 2006.
9. H.A. Cummins, *Women's Studies International Forum*, 28, 222-231, 2005.
10. Ann Crittenden, *The Price of Motherhood: Why the Most Important Job in the World is Still the Least Valued*, Holt Paperbacks, 2002.



Different Worldviews





Thank You!

Associate Professor Adriana Predoi-Cross, PhD

Department of Physics and Astronomy

University of Lethbridge, Lethbridge, Alberta, Canada

“The question is not why there have not been more women in science; the question is rather why we have not heard more about them.” Naomi Oreskes, historian of science

WOMEN IN SCIENCE