

# The Canadian Challenge: Attracting and Retaining Women in Physics

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## Abstract

Canada continues to face a challenge in attracting women and retaining them in physics related positions. The challenge will remain as long as there are so few female role models to influence girls and young women in schools and universities. A decade ago, an international study on Gender distribution in Physics Departments (1) showed that the representation of women in North American Physics Departments was of the order of 4% compared to 23-47% in Western and Eastern Europe. In 1995, the Committee to Encourage Women in Physics (CEWIP) of the Canadian Association of Physicists (CAP) sponsored a survey of Canadian Physics Departments in Colleges and Universities to survey women in physics. The findings (2) showed that although women obtained 18% of the B.Sc. degrees in physics and 13% of the Ph.D. degrees, only 5% of Faculty members and 2% of tenured Faculty members were women. At the time, 11% of Faculty positions were tenure-stream positions and women held 28% of these positions. The numbers gathered six years ago painted a rather bleak picture in which 80% of the 40 Canadian Universities that responded to the survey had either one or no woman on faculty while 45% had none at all. The results of a new survey being conducted in 2001-2002 show some substantial improvement, with women now holding 8% of all physics faculty positions, 5% of the tenured positions and 21% of the tenure-track positions. The fraction of physics departments with one

or no woman faculty member has fallen steadily since 1995 and it is particularly pleasing to note that only 10% of the Ph.D.-granting departments now have no woman faculty member, compared with 36% in 1995. The indication from a Statistics Canada Labour Force survey is that, in 2000, only 2.8% of women worked in the Natural Sciences, Engineering and Mathematics fields compared to 1.8% in 1987.

This poster mentions some of the programs which were implemented to improve the Canadian environment for women in physics, developed to promote scientific leadership amongst young women and established to provide role models to school children and valuable partnerships with elementary and secondary school teachers.

It is clear that much remains to be done to empower girls and young women to take up physics when there are so few role models to encourage them to do so. While progress is being made, there is still a problem of women dropping out of physics programs at each level and there is a very low representation of women at the most senior levels in Universities, Industries and Government laboratories.

1. W. J. Megaw, "Gender Distribution in the World's Physics Departments", paper prepared for Gender and Science and Technology 6, Melbourne, Australia, July 14-18, 1991.
2. J. Lagowski and J. McKenna, "Physics in Canada", vol. 52, no. 2, 106 (1996).

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Some of the survey questions sent to Physics Departments

1. Does your Department grant graduate degrees in physics?
  - 2a. During the period 1995-2001, how many students received a B.Sc. in physics or Engineering Physics in your Department?
  - 2b. How many of these B.Sc. graduates were female?
  - 3a. During the period 1995-2001, how many students received a M.Sc. in physics?
  - 3b. How many of these M.Sc. graduates were female?
  - 4a. During the period 1995-2001, how many students received a Ph.D in physics?
  - 4b. How many of these Ph.D. students were female?
  - 5a. How many faculty members are presently in your Department?
  - 5b. Of these faculty members, how many are female?
  - 5c. How many tenured faculty are presently in your Department?
  - 5d. How many of these tenured professors are female?
  - 5e. How many tenure-track faculty are presently in your Department?
  - 5f. How many of these tenure-track professors are female?

## Programs to encourage women in physics

In recent years a number of programs have been implemented to help improve the environment in Canada for women in physics. In 1997, the Canadian government funded five new Chairs for Women in Engineering and Science (CWES) through the Natural Sciences and Engineering Research Council (NSERC). NSERC also instituted the University Faculty Awards program to encourage universities to hire women and aboriginal peoples in tenure tract positions by offering partial salary support for five years with a guaranteed NSERC research grant. Another successful program is the NRC-run Women in Engineering and Science (WES) program. This program awards twenty-five new fellowships yearly allowing undergraduates in science and engineering to work at NRC for three consecutive summers. One program that provides role models to school children and professional development for science teachers is the award-winning "Let's talk science" program. Prominent role models have been played by the Canadian female astronauts, Drs. Roberta Bondar and Julie Payette who inspire young women to pursue studies in science and engineering.



Percentage of women in all Canadian Physics Departments

Period	1993-1995	1995-1998	1998-2001
B.S. grads	18 %	20 %	22 %
Faculty	5 %	5 %	8 %
Tenured faculty	2 %	3 %	5 %
Tenured track faculty	28 %	15 %	20 %



Environment  
Canada

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Percentage of women in Ph.D. granting Physics Department

Period	1993-1995	1995-1998	1998-2001
B.S. grads	18 %	21 %	22 %
Ph.D. grads	13 %	13.5 %	15 %
Faculty	4 %	4 %	8 %
Tenured faculty	1.5 %	3 %	5 %
Tenured track faculty	28 %	16 %	21 %



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Percentage of Physics Departments with only one or no woman faculty member

Period	1993-1995	1995-1998	1998-2001
Women faculty	No women 0 or 1	No women 0 or 1	No women 0 or 1
All Canadian Physics Dept.	45% 80%	40% 65%	26% 58%
Ph.D. granting Physics Dept.	36% 72%	31% 46%	10% 40%



NSERC Research Grants Holders in 2000

Discipline	Total	Male	Female	Not identified
Condensed matter	209	197	10	2
General	126	113	11	2
Subatomic	130	114	8	8
Total	465	424	29	12
% of total	100%	91%	6%	3%
Astro	159	143	12	4
% of total	100%	90%	7.5%	2.5%
NSERC: all science & engineering	7552	6126	901	525
% of total	100%	81%	12%	7%