Gender Summit North America

Washington, D.C November 13 2013

« Encouraging young women to study science and engineering and enhancing the status of women in the professions »

The contribution of Canadian women engineers and scientists to the shaping of policy, 1970's -2000's

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Background

- Historian of women in higher education and the professions in Canada
- Closely involved in Women's Studies
- Board member of International Network of Women Engineers and Scientists (INWES) Education and Research Institute (ERI)
- UOWERG: multidisciplinary research team working on vast study on engineering education in Canada

WHY HISTORY MATTERS

US historian Gerda Lerner has argued that women's struggle to comprehend their own history lies at the heart of their ability to envision a world in which they are full participants.

Marianne G. Ainley: born in Hungary, trained as a chemist, pioneer historian of women and science in Canada: "*More detailed women-centred research has revealed that…many women studied and worked in science and achieved recognition, although their professional lives followed different paths both from their male peers and even from each other".*

Forthcoming project

Creating the Memories and Celebrating the Legacy of the Bold and the Brave: Building the Archives of Women Scientists and Engineers in Canada

- **WORKSHOP September 11-12, 2014 University of Ottawa, Ontario CANADA**
- To help provide women scientists and engineers in Canada with an accurate and inspiring understanding of their past.
- Will bring together women in STEM, historians, archivists, museums curators and science writers to draft action plan aimed at collecting, preserving and providing access to an Archives of Women Scientists and Engineers in Canada.

Presentation: based on current research project

- *The "problem" of women in S&E in Canada since the 1970's: The construction of gendered debates, interventions and policies*

MAIN FEATURES OF PROJECT

- The **unequal participation of women in S&E** has been a source of interest and concern for more than three decades in Canada.
- The issue has been consistently defined as an ongoing « **problem** »
- Need to return to the past to place the ***making*** of this « problem » in its **historical context**
- Need to develop a **general interpretative framework** with which to map this process's different phases and its various manifestations over time.

Analytical Framework

- Examine the conceptualization of the unequal participation of women in Canadian S&E as a gendered **« problem »** requiring specific types of interventions

- Identify the main **groups and actors** involved in the ***making*** of the « problem » of women in S&E?

- Build inventory of the main **outcomes** linked to the making of the « problem » of women in S&E (policies, measures and programs, knowledge production, new or increased activism, growth of public awareness and support, etc.)

Project's main goals:

1.Fill some **important gaps** in Canadian scholarship:

Women engineers and scientists largely absent from field of women's history

Incorporate gender lens into analysis of Canadian science and technology (S & T) policy (scholarship remains largely gender blind)

Encourage historians of women examining the evolution of Canadian public policy to examine developments in science and technology (focus on social policy, health policy and family policy)

2.Provide scholars, activists, educators and policy makers with **comprehensive historical survey** of what has been done so far to solve the "problem" of women in S & E in Canada.

3. Encourage **comparative studies** involving Canada

Will focus today on one of project's main findings:

- Individual and collective activism of women scientists and engineers in Canada constitutes key chapter in their history since the 1970's
- This chapter provides important insights into the history of the women's movement and of S&T policy in Canada

Historical roots of "women's movement in Canadian science and engineering"

- First generation of activists: 1950's and 1960's

  Two prominent leaders:

  -Elsie Gregory McGill, professional engineer

  -Ursula Franklin, academic

Elsie Gregory McGill, Canada's first woman engineer

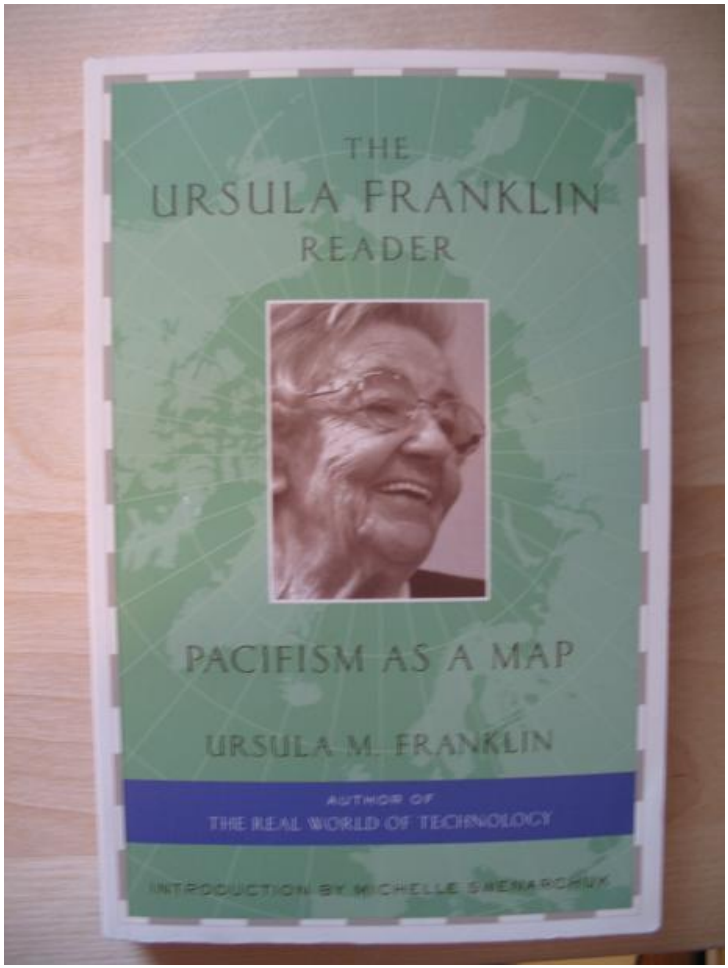
First woman to graduate in electrical engineering from University of Toronto

First woman aircraft designer in the world

Leading member of Business and Professional Women's Clubs
Member of the **Royal Commission on the Status of Women** (1967–1970): by that time, an avowed feminist

Queen of the Hurricanes, WWII

URSULA FRANKLIN



- Professor, FASE, U of T (retired)
- Pacifist (Voice of Women)
- Feminist critique of technology
- and engineering
- Urged her students: “Don’t check your feminism the laboratory door”

Identifying and defining the « problem » of women in science and engineering, 1970's –early 1980's: Critical role of emerging women's movement

- 1970: watershed **Report of the *Royal Commission on the Status of Women* (RCSW)**: girls urged to enter all "masculine" professions in name of equality
- **Institutionalization of women's movement** in the 1980's support this campaign at the national level:

-*National Action Committee on the Status of Women* (NAC): (national feminist lobby)

-*Femocrats* in federal government provide funds for advocacy groups and activist work promoting recruitment of women in S&E.

The "problem" associated with issues of s**exism, gender stereotyping, inequality of opportunity and segregation in the workplace.**

Feminist leaders endorse the "**Human Rights" agenda and the "Just Society**" platform of the federal liberal government (P.E. Trudeau) during the late 1970's and early 1980's.

The road to mobilization

- Impact of women's movement, including the removal of more blatant legal and administrative barriers to women's equal access to educational and employment opportunities*, leads to change of attitude with respect to women's participation in science and engineering.
- A closer look at the situation in engineering illustrates this change:

-starting in the 1970's, steady and continuing increase in female enrolments in undergraduate engineering programs

-results of survey conducted in early 1980's amongst community of women engineers: express increasing support for separate women's associations and a growing interest in joining; they also seek greater visibility and recognition

* major victory in 1982 with the entrenchment of the principles of gender equality and employment equity in the Canadian Charter of Rights and Freedoms.

Building the institutional foundations of women's activism in science and engineering, 1970's-1980's

Separate associations created, mainly to increase numbers and to raise status of women scientists and engineers. EX:

- 1977: Women in Science and Engineering (WISE) (located in academia: local chapters established in faculties of science and engineering)
- 1981: Society for Canadian Women in Science and Technology (SCWIST) (Vancouver, BC)
- 1981: first Canadian Chapter of US based Association for Women in Science (CAWIS) (Toronto, ON)
- 1982: Women in Scholarship, Science, Engineering and Technology (WISEST) (University of Alberta)
- 1987 : Canadian Conference of Women in Engineering, Science and Technology (CCWEST): *national organization* to act as lobby group with federal and provincial governments, industry and media. Becomes CCWESTT in 1992 (Canadian Coalition of Women in Engineering. Science, Trades and Technology).

Links with « second-wave »women's movement

- Claudette Mackay-Lassonde, prominent engineering activist, credits women's movement for creating a"*wave of awareness of women's ability to achieve*".
- Lassonde and others activists subscribe to principle of equal rights and social justice: support full access of women to S & E professions; abolition of sexism and of discriminatory practices; promotion of women in leadership positions.
- *Femocrats* in federal government provide funds to some of the new Women in S & E associations
- Women scientists and engineers in universities:(Ursula Franklin, Maggie Benston, Roberta Mura, Karen Messing) develop feminist critiques of science and engineering.

BUT:

- Mid 1980's -: Ruling Conservative Party triggers intense backlash against institutional feminism (cuts in funding, programs closed, etc.)
- Activists from S & E face strong masculine cultures in higher education and the workplace which constitute major challenge to promotion and implementation of "radical" feminist agendas

Women scientists and engineers fulfilling the "manpower" needs of the Canadian nation in S & T: 1980's

- Federal government increasingly concerned with **nation's economic productivity** in a period of rapid technological change and increasing economic globalization.
- Concern fed by perceived **threat of massive skill shortages** in S & T.
- Women constitute **valuable and underutilized resource**
- Continuing search for ***national science and technology policy*** in Canada further integrates the "problem" of women in S & E in the federal policy agenda, with focus on training of Highly Qualified Personnel (HQP) in universities.
- 1987: Adoption of first National S & T Policy: participation of women in S&E appears as a key component of the government's envisaged "*national system of innovation*."

National Sciences and Engineering Research Council (NSERC): strategic player in Canadian S & T Policy

- Federal S & T policy calls for collaboration between four major groups of **stakeholders:** government, industry, national granting agencies (mainly NSERC) and academia.
- This approach leads to the creation, in 1989, of ***the National NSERC/Northern Telecom Chair for women in engineering.*** Funded with support of the federal government and of its industrial partner, the Chair is a unique model, the first of its kind in the world. Devoted to the recruitment and promotion of women in engineering
- **Major policy statement**: model involves participation of public and private sectors, including. Allows involvement of federal government in higher education (research and teaching).
- **Claudette Mackey-Lassonde** plays critical role in the creation of this national chair: holds senior position **at NORTEL**, appointed **first female vice president of the Board of NSERC**, and sits on new National Advisory Board on Science and Technology, organization established by the Conservative government and chaired by the prime minister.

Montreal Massacre - December 6th, 1989

Geneviève Bergeron
November 26th 1968
December 6th 1989

Annie Turcotte
March 1st 1969
December 6th 1989

Anne-Marie Edward
October 25th 1968
December 6th 1989

Nathalie Croteau
September 25th 1966
December 6th 1989

Sonia Pelletier
August 19th 1961
December 6th 1989

Barbara Maria Klueznik
October 19th 1958
December 6th 1989

Maryse Leclerc
January 3rd 1966
December 6th 1989

Hélène Colgan
July 20th 1966
December 6th 1989

Anne-Marie Lemay
June 25th 1967
December 6th 1989

Barbara Daigneault
March 2nd 1967
December 6th 1989

Maryse Laganière
April 9th 1964
December 6th 1989

Maud Haviernick
February 20th 1960
December 6th 1989

Michèle Richard
May 5th 1968
December 6th 1989

Annie St-Arneault
March 1st 1966
December 6th 1989

http://www.chebucto.ns.ca/CommunitySupport/Men4Change/picture.html

The Montreal Massacre: a catalyst for change

December 6, 1989, brutal murder of fourteen young women – twelve of them students- at Montréal's École Polytechnique.

- **Tragedy acts as catalyst:**

-immediately propels "problem" of women in science and engineering in the public arena

-leads to a renewed and more self-reflective concern for the status of women amongst members of the engineering profession.

- Ursula Franklin recalls: "*It became possible to speak publicly about the chilly climate, about bias, about sexism, misogyny and patriarchy*"

Montreal Massacre: aftermath

- Myriad of new programs and measures aimed at reaching out to girls and young women (k-12) and supporting female university students and professional women.

- 1991: NSERC Women Faculty Awards : foster recruitment of female professors in S & E

NSERC : Building a new scientific and engineering culture in Canada

- 1990: **Canadian Committee on Women in Engineering**

Chaired by **Monique Frize**, National NSERC/Northern Telecom Chair for Women in Engineering, with support from federal government (Industry- Science and Technology Canada)

Aims to "*uncover the social and cultural barriers responsible for the underrepresentation of women in engineering and to design bridges that will bring them as full participants into the professions*"

Report: *More Than Just Numbers (1992)*

"The recommendations in **More than just numbers** go beyond attracting greater numbers of women into the engineering profession. Canadians must ensure that the **learning and working environments welcome, support and appreciate women engineering students and engineers**."

1994-1996 NSERC Task Force on Women in Science and Engineering (Chair: Monique Frize):

To advise Council on how to create an environment that facilitates and encourages greater participation of women **in science and engineering research in Canada**, particularly through the core programs.

"The Task Force readily admits that the recommendations to NSERC are only **one element in a continuum of actions** that must be taken, beginning with the primary and secondary schools system… Beyond increasing the numbers, following up on these recommendations will send a message to women that they are an important component of the development of a broader science culture in Canada"

A new agenda to fix the "problem" of women in S&E in the 21st century.

- No longer sufficient to **bring more** women in the educational and professional pipeline (access model)
- Should not try to **fix women** so they can adapt and blend in (become "*one of the boys*") (inclusion model)
- You need to **fix the institutions** by attacking the "*chilly climate*" : transform the practices and unspoken assumptions and values which underlay the dominant masculine cultures of science and engineering (institutional transformation model)

Institutional transformation through NSERC Chairs for women in S& E

1996: NSERC funds **five Regional Chairs for Women in Science and Engineering** (still university-based, supported by NSERC and private sector partners)

Broad mandate

-continuing intervention at elementary and high school levels

-increased focus on retention and support of female university students at all levels, and of female faculty at all ranks

-increased efforts to promote women in leadership positions

-foster research on women in S & E

2000's: Growing Activism

Going Global: 2001: Monique Frize and other leading Canadian activists launch the **International Network of Women Scientists and Engineers** (INWES) in Ottawa, Canada

2002: Francophone activists create own organization: AFFESTIM (**Association de la francophonie à propos des femmes en sciences, technologies, ingénierie et mathématiques***).* Founding President: Claire Deschênes, NSERC Chair holder for Québec region

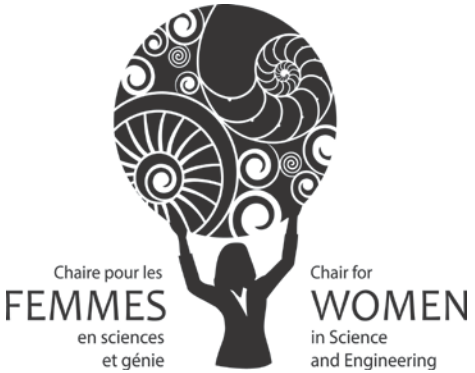
3 decades of activist work in Canada: what historical research tells us:

- Integrating a **gender lens** in the historical study of Canadian S&T policy reveals the key role played by women scientists and engineers in the making of the « problem » of their underrepresentation and unequal participation in these fields
- The making of S & T policy is **not a gender neutral process**
- The development of the women's movement in S & E has been shaped by **various factors**: the impact of institutional feminism, industry needs for skilled "manpower", Canada's concern for increasing competition in the global economic market, key role of NSERC, and the adoption of a national S & T policy.

3 decades of activist work in Canada: what historical research tells us:

- Activist leaders played key role in promoting a « paradigm shift » in the understanding of the « problem » of women in S& E.(From inclusion model to institutional transformation model)
- NSERC chairholders have fostered the production of data and new knowledge on women in S & E to help them develop more effective means of action: interdisciplinary research involving scholars from the humanities and social sciences

Forthcoming project



Ruby Heap and Catherine Mavriplis NSERC/Pratt & Whitney Chair for women in S&E (Ontario region

"Breaking the Code": Women in Computing in Canada since World War II

- Main goals:
- To fully integrate women and gender into the history of the field in Canada;
- To underline the importance of conducting historical research to have a better understanding of current situation of women and to inform policy makers

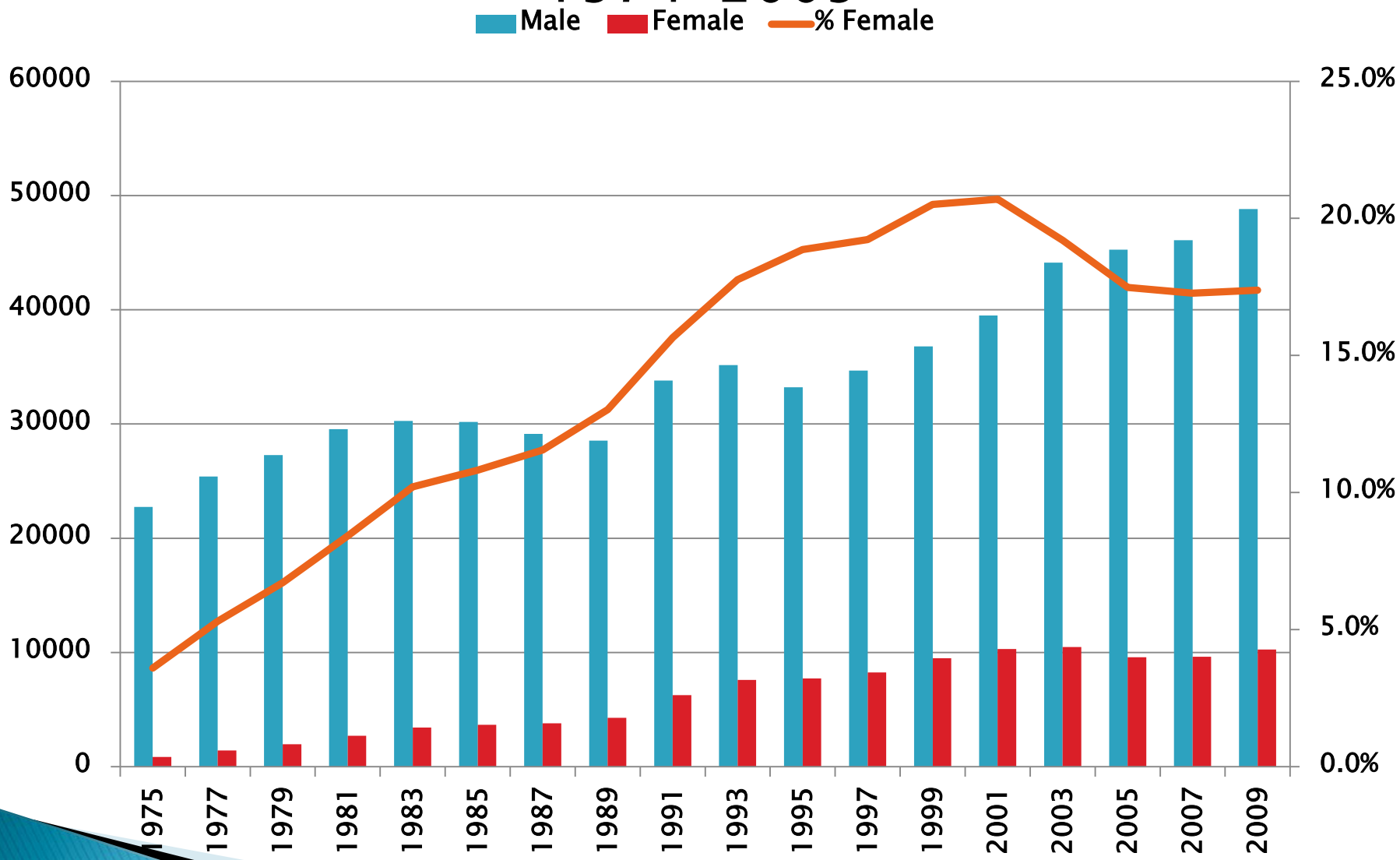
FAST FORWARD……

DATA DEMONSTRATES POSITIVE CHANGES WITH RESPECT TO PARTICIPATION OF WOMEN IN STEM FIELDS

BUT

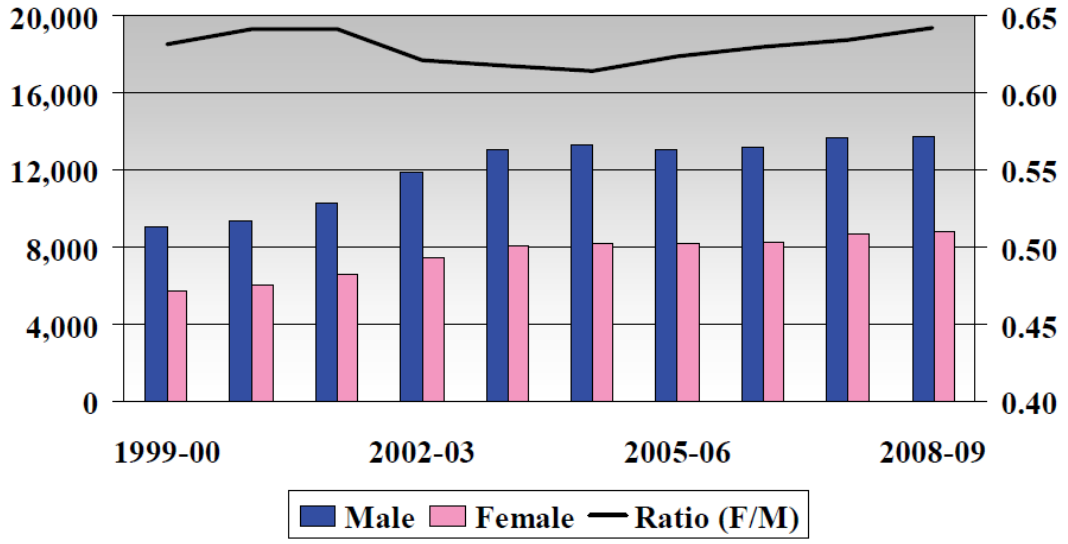
ALSO ILLUSTRATES PERSISTING DIMENSIONS OF THE “PROBLEM”

Enrolments, Undergraduate Engineering, Canada 1974–2009



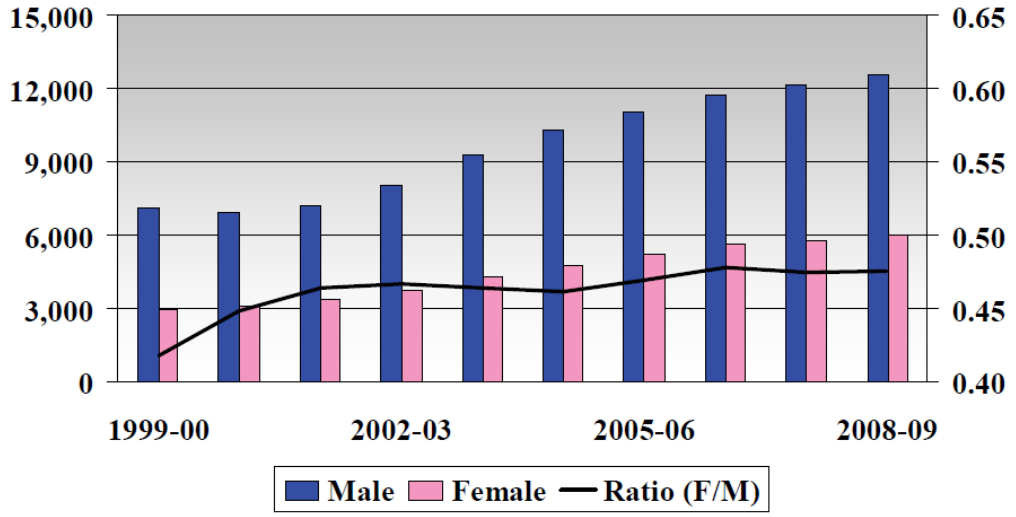
Sources: Ruby Heap and Monique Frize, "The Professional Education of Women Engineers in Ontario and Quebec"; CCPE, "Canadian Engineers for Tomorrow," November 2005; and CCPE, "Canadian Engineers for Tomorrow," September 2010.

Figure 2.8
Full-time Master's Enrolment in the Natural Sciences and Engineering



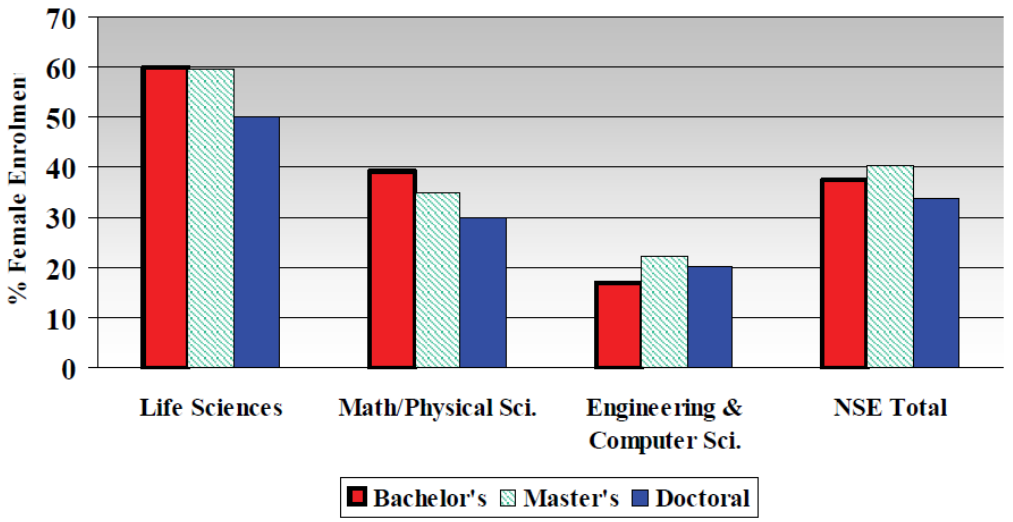
Source: Statistics Canada.

Figure 2.9
Full-time Doctoral Enrolment in the Natural Sciences and Engineering



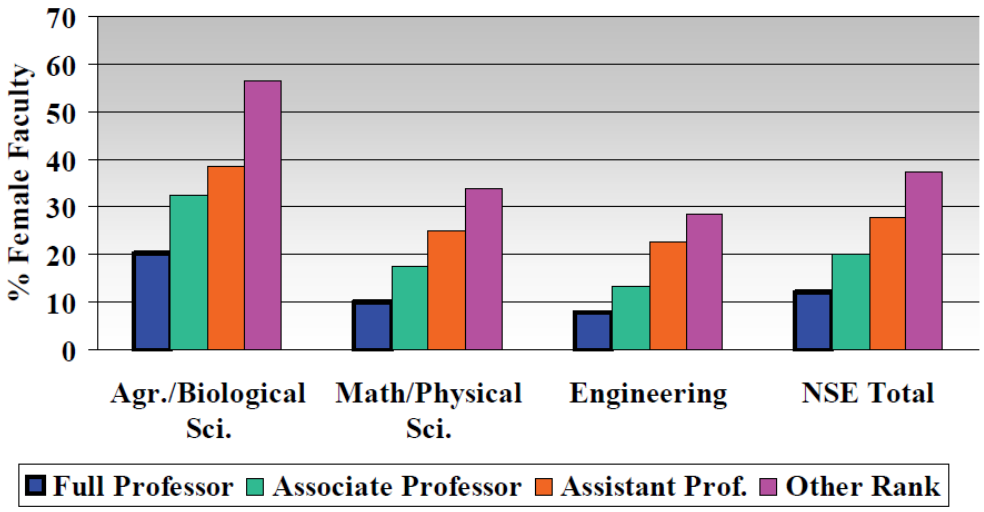
Source: Statistics Canada.

Figure 2.10
Female Enrolment[1] in the Natural Sciences and Engineering as a % of Total NSE Enrolment by Degree Level and Discipline, 2008-09
(Canadian and Permanent Residents)



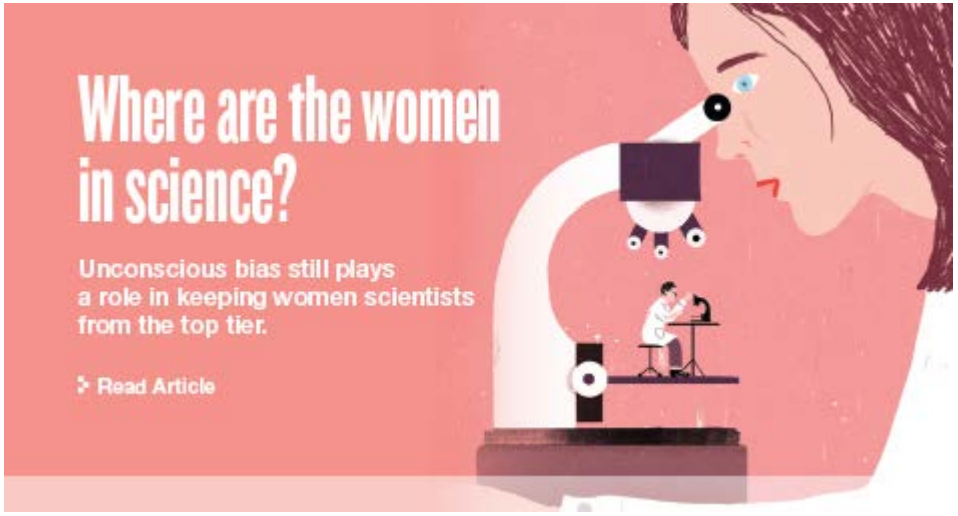
1. Full-Time.
Source: Statistics Canada.

Figure 3.11
Percentage of Female Faculty in the Natural Sciences and Engineering as a % of Total NSE Faculty by Discipline and Rank, 2008-09



Source: Statistics Canada.

October 9, 2013
University Affairs
Article by Harriet Eisenkraft



- Why are women in S & E still c*ontroversial* after more than 30 years? (as stated by Sue Rosser in latest book, *Breaking into the Lab* (2012)
- Rosser: many of the past issues are still here today, but in different form (*unconscious bias*) or expressed in a different language (gender discrimination, work/life balance, glass ceiling, etc.)
- Need to reconsider what has been done so far?

Historical research points to key challenge: Complexity of "Women in STEM"

-of profiles of women in STEM (intersection of gender with categories of "race", ethnicity, religion, (dis)ability, sexual orientation)

-of lives of women in STEM

-of institutions (schools, colleges, universities, private and public sector)

-of *cultures* in STEM (ex: discipline-based)

-of masculinities and feminities

Challenge: How to develop policies and action plans that take this complexity into consideration?

THANK YOU!