



# **Women in Science: Their Numbers and their Under-representation**

**Maryse Lassonde**  
**President, Royal Society of Canada,**  
**Montevideo 2016**

# **IANAS**

## **InterAmerican National Academies of Science**

- Regional network of Academies of Sciences created to support cooperation towards the strengthening of science and technology as a tool for advancing research and development, prosperity and equity in the Americas.
- Founded in the spirit of IAP in May 2004
- 19 countries involved

# **IANAS**

## **Women for Science program**

- **Under the sponsorship of IAP, the Global Network of Science Academies, IANAS established the Women for Science Working Group (WfS-WG) in June 2010.**
- **WfS-WG members are associated with North American, Latin American and worldwide organizations that focus on engaging and empowering women in S&T.**

# **What has the SfS-WG done?**

- **Biographies of women scientists to incite younger women and girls to begin or continue scientific careers.**
- **Women in Science in the Americas: Their Inspiring Stories: >100,000 hits on website**
- **Young Women Scientists: new publication issued on March 8, 2016**
- **Worked on a video series featuring women scientists, a mentorship program and other programs**
- **Encouraged all Academies of science to plan programs and actions to include more women.**
- **Survey of women in National Academies in the world**

# IANAS-The Americas and IAP-The Global Network of Science Academies

## IANAS Survey May 2015



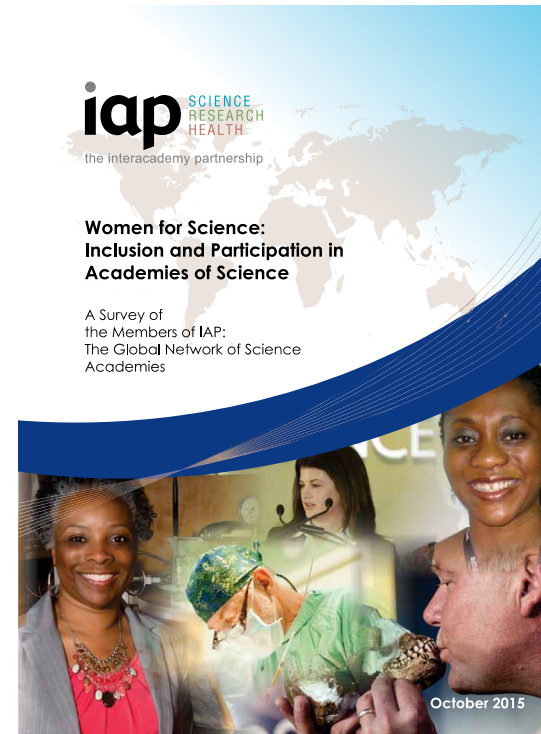
### **SURVEY OF WOMEN IN THE ACADEMIES OF THE AMERICAS**

REPORT PREPARED BY FRANCES HENRY  
FOR THE IANAS WOMEN FOR SCIENCE PROGRAM

MAY 2015



## IAP Report October 2015



**TABLE 1: ACADEMY MEMBERSHIP**

Academy	Number of Women Members	Total Number of Members	Percentage of Women Members	Type of Membership	Has Gender Policy
Argentina	4	34	11.76	Capped	
Bolivia	4	47	8.51	Open	
Brazil	64	506	12.65	Open	
Canada	346	2108	16.41	Capped	
Caribbean	57	223	25.56	Open	✓
Chile	9	75	12.00	Capped	✓
Colombia	26	190	13.68	Open	
Costa Rica	10	53	18.87	—	
Cuba	85	313	27.16	Open	✓
Dominican Republic	22	168	13.10	Capped	
Guatemala	8	68	11.76	Open	
Honduras	5	29	17.24	Open	
Mexico	587	2499	23.49	Open	✓
Nicaragua	7	30	23.33	Open	
Panama	50	124	40.32	Open	
Peru	23	114	20.18	—	—
United States (NAS)	294	2252	13.06	Open	
Uruguay	5	26	19.23	Capped	
Venezuela	7	50	14.00	Capped	
TOTAL	1613	8909			
AVERAGE TOTAL	18.11%				

# IAP Survey

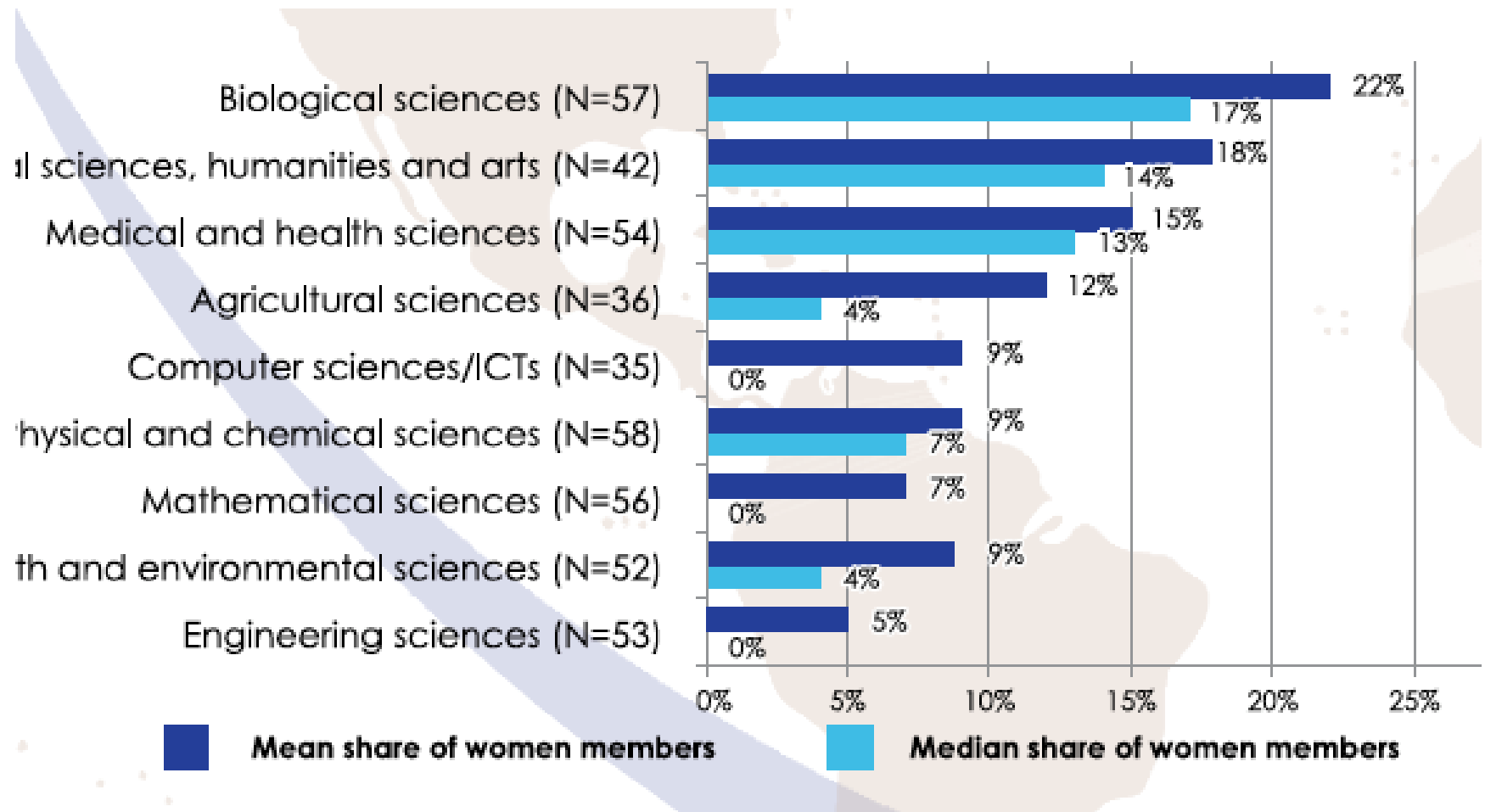
- **The three national academies with the largest shares of women members are both IANAS members:**
- **The Panamanian Association for the Advancement of Science (40%), the Cuban Academy of Sciences (27%) and the Caribbean Academy of Sciences (26%).**
- **The Mexican Academy of Sciences, Nicaragua, Peru, Uruguay and Honduras – all IANAS members – are among the list of the top 10 academies with the largest shares of women members.**

# IAP Report

- **Women are ‘best’ represented in the social sciences, humanities and arts (16% of all members in this discipline, across all science academies, are women), followed by**
- **The biological sciences (15%) and the medical and health sciences (14%).**
- **Women’s representation as academy members is least in the mathematical sciences (6%) and engineering sciences (5%)**



# IAP-Report



# IAP-Report

**Table 6: Women as percentage of members of national science academies, by IAP world region**

IAP world region	% Women		Number of academies	Standard deviation	Minimum	Maximum
	Mean	Median				
Africa	10%	10%	10	6%	4%	24%
Central & Eastern Europe	13%	12%	4	10%	4%	24%
Latin America & the Caribbean	17%	14%	16	5%	9%	27%
Middle East & Central Asia	8%	8%	3	1%	7%	9%
North America	15%	15%	2	2%	13%	16%
South Asia	10%	8%	4	6%	6%	18%
South East Asia & the Pacific	10%	10%	6	5%	5%	17%
South Eastern Europe	10%	10%	6	3%	5%	15%
Western & Northern Europe	11%	12%	12	4%	5%	17%
<b>Total</b>	<b>12%</b>	<b>11%</b>	<b>63</b>	<b>6%</b>	<b>4%</b>	<b>27%</b>

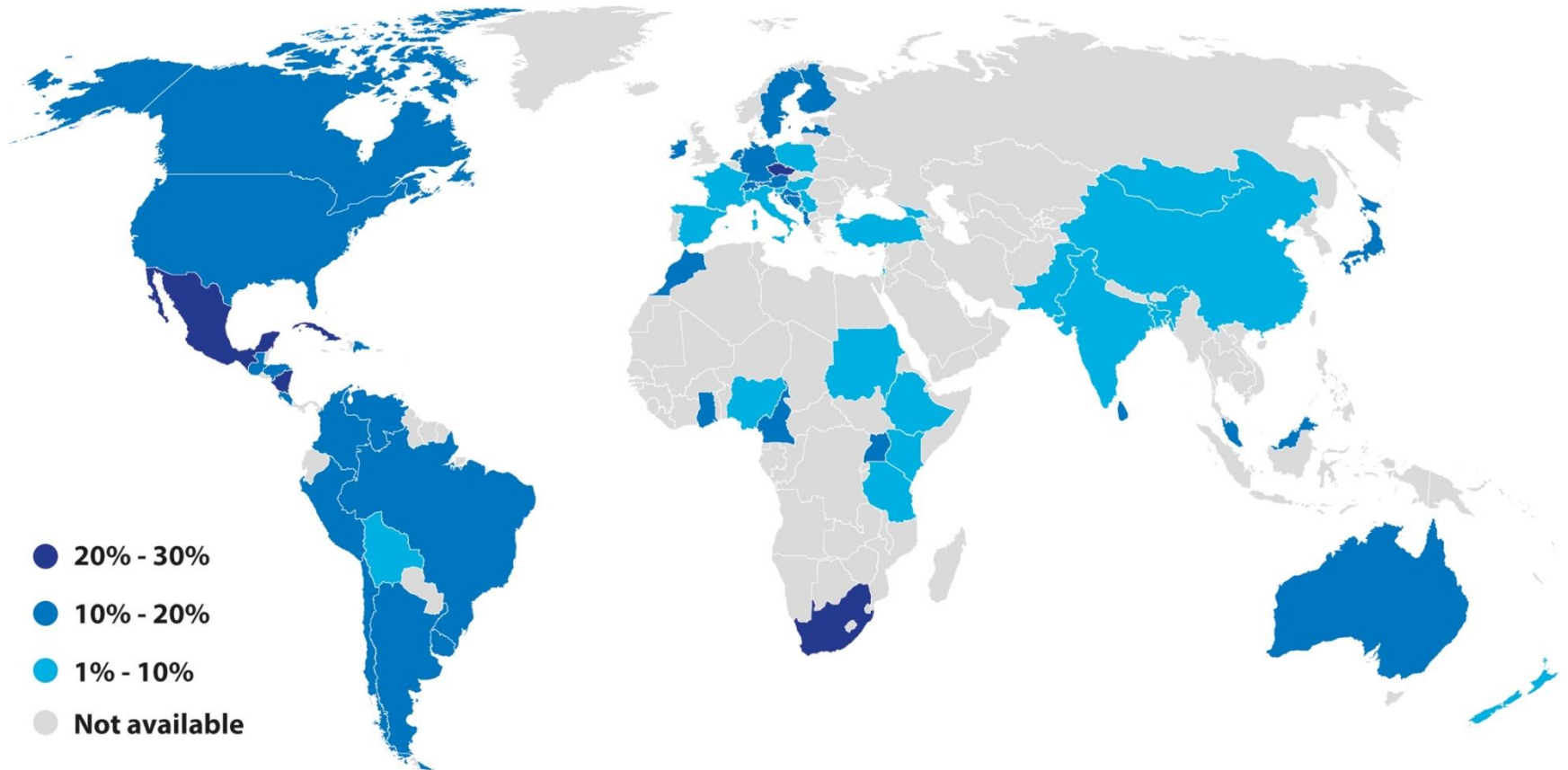
Note: The standard deviation refers to the variation in the shares of women members of the individual academies.

# IAP Report

**Table 7: Descriptive statistics for women as percentage of members of national science academies, by broad discipline group**

	Agricultural sciences	Biological sciences	Computer sciences/ICT	Earth & environmental sciences	Engineering sciences	Mathematical sciences	Medical & health sciences	Physical & chemical sciences	Social sciences, humanities & arts
Number of academies	36	57	35	52	53	56	54	58	42
<b>Women as % of members of national science academies</b>									
Mean % per academy	12%	22%	9%	9%	5%	7%	15%	9%	18%
Median % per academy	4%	17%	0%	4%	0%	0%	13%	7%	14%
Standard deviation	22%	22%	20%	11%	9%	16%	11%	9%	15%
Minimum %	0%	0%	0%	0%	0%	0%	0%	0%	0%
Maximum %	100%	100%	100%	40%	50%	100%	44%	40%	70%
<b>number of total members (men and women) of national science academies</b>									
Mean number per academy	20	57	17	28	39	25	60	75	124
Median number per academy	11	17	7	14	16	12	26	31	49
Standard deviation	25	93	26	32	62	30	85	111	188
Minimum number	1	1	1	1	1	1	1	2	1
Maximum number	130	443	116	125	319	139	444	672	925

# IAP-IANAS Survey



Source: IAP-IANAS Survey 2015

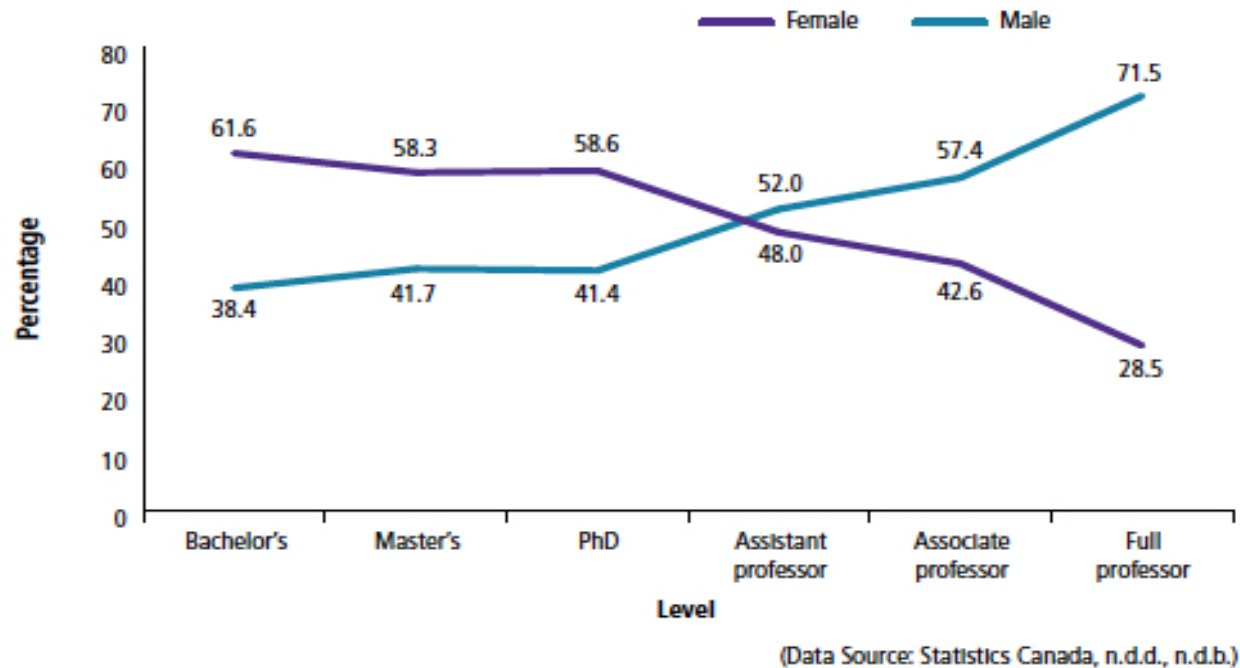
# WOMEN IN EDUCATION

- In the **U.S**: women now **receive half the doctorates** in science and engineering in the United States, they make up only **21** percent of full science professors and merely **5** percent of full engineering professors.
- In the **UK**: women make up just **12.8% of** the Stem workforce

# EDUCATION/WORK

- UK (Cont.): Women are under-represented at professorial levels across academic research careers in all Stem disciplines -17%
- 52% of male undergraduates were enrolled on a science course compared to 40% of females. Many more boys than girls study hard sciences such as physics.

# Participation of Women in Ranks SSH and Education

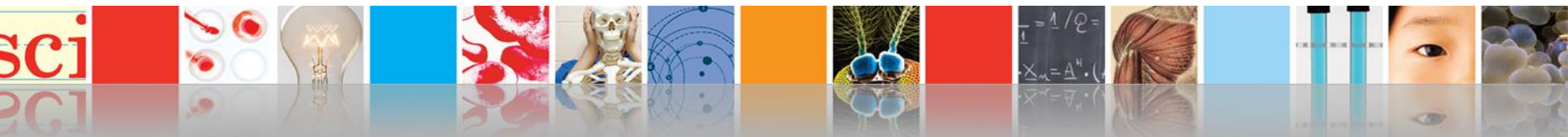


**Figure 3.2**

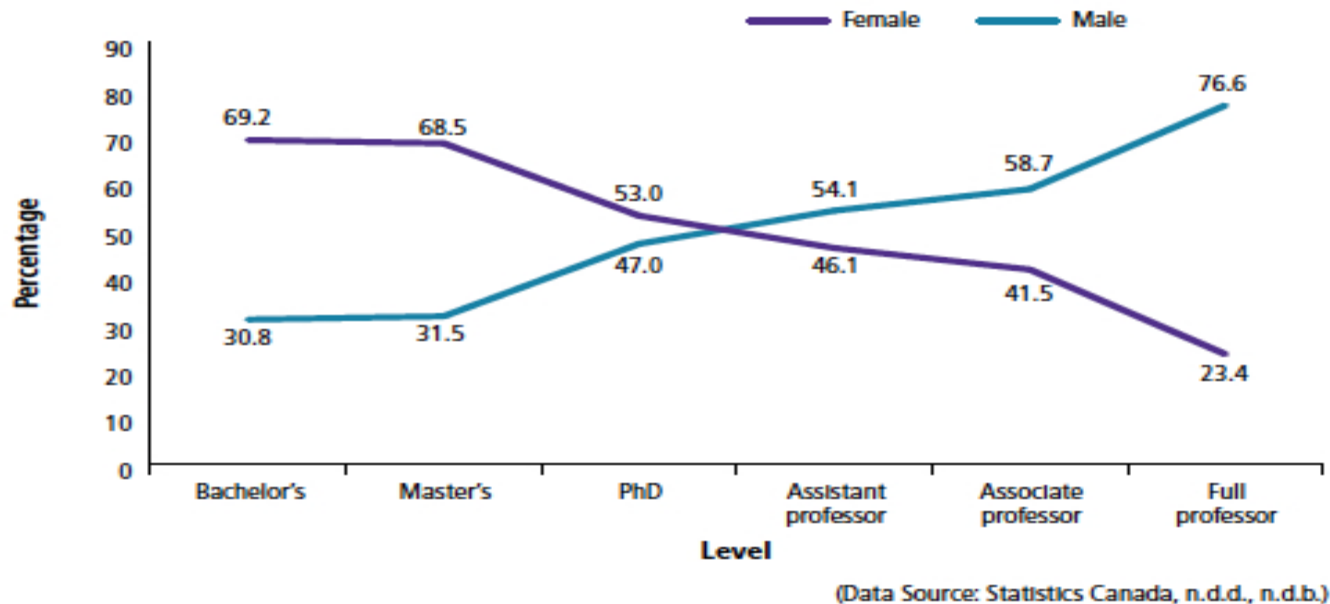
## **Percentage of Women and Men at Different Academic Levels in HSE**

This figure displays the percentage of women and men in humanities, social sciences, and education in 2008–2009 at various stages of the academic career in Canadian universities.

Source: Strengthening Canada's Research Capacity: The Gender Dimension, Council of Canadian Academies, 2012



# Participation of Women in Ranks Life Scs

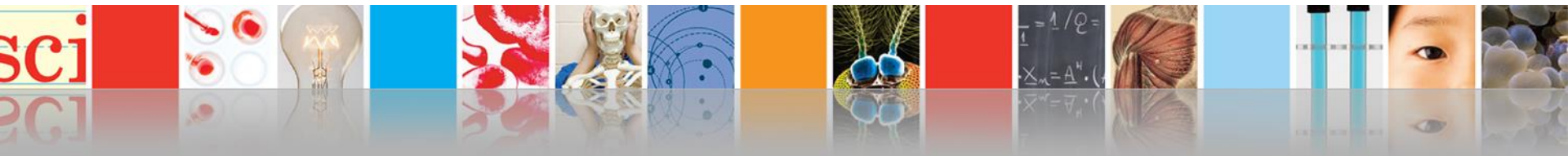


**Figure 3.3**

## **Percentage of Women and Men at Different Academic Levels in LS**

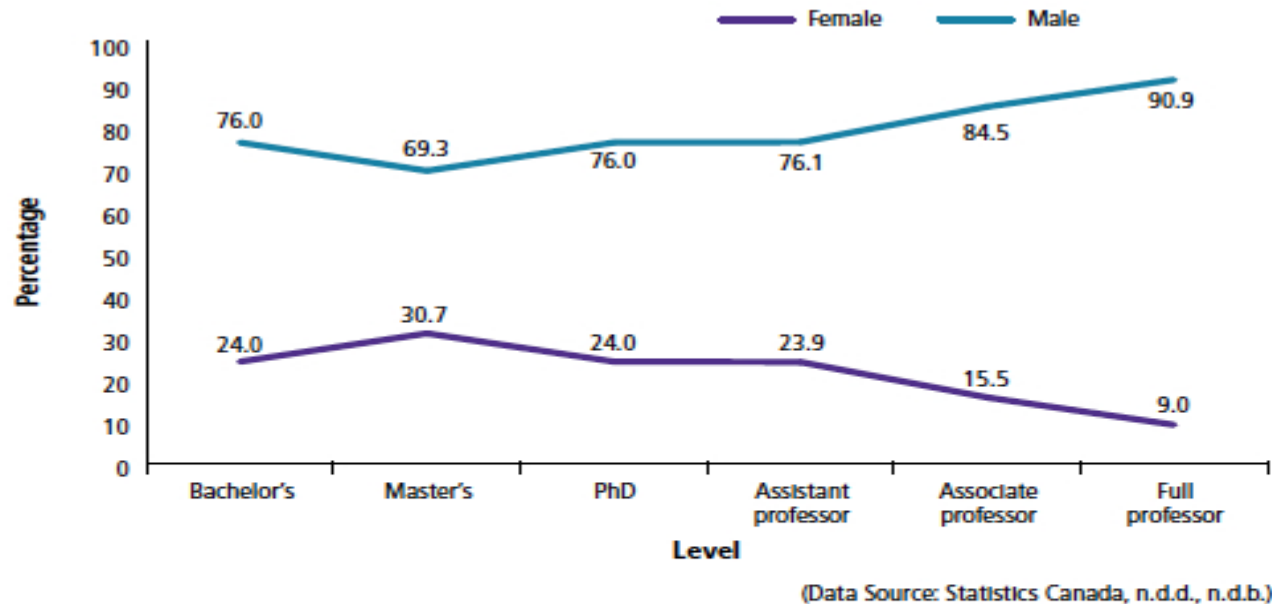
This figure displays the percentage of women and men in life sciences in 2008–2009 at various stages of the academic career in Canadian universities.

Source: Strengthening Canada's Research Capacity: The Gender Dimension, Council of Canadian Academies, 2012





# Participation of Women in Ranks Physical Scs, CS, Eng, Math



**Figure 3.4**

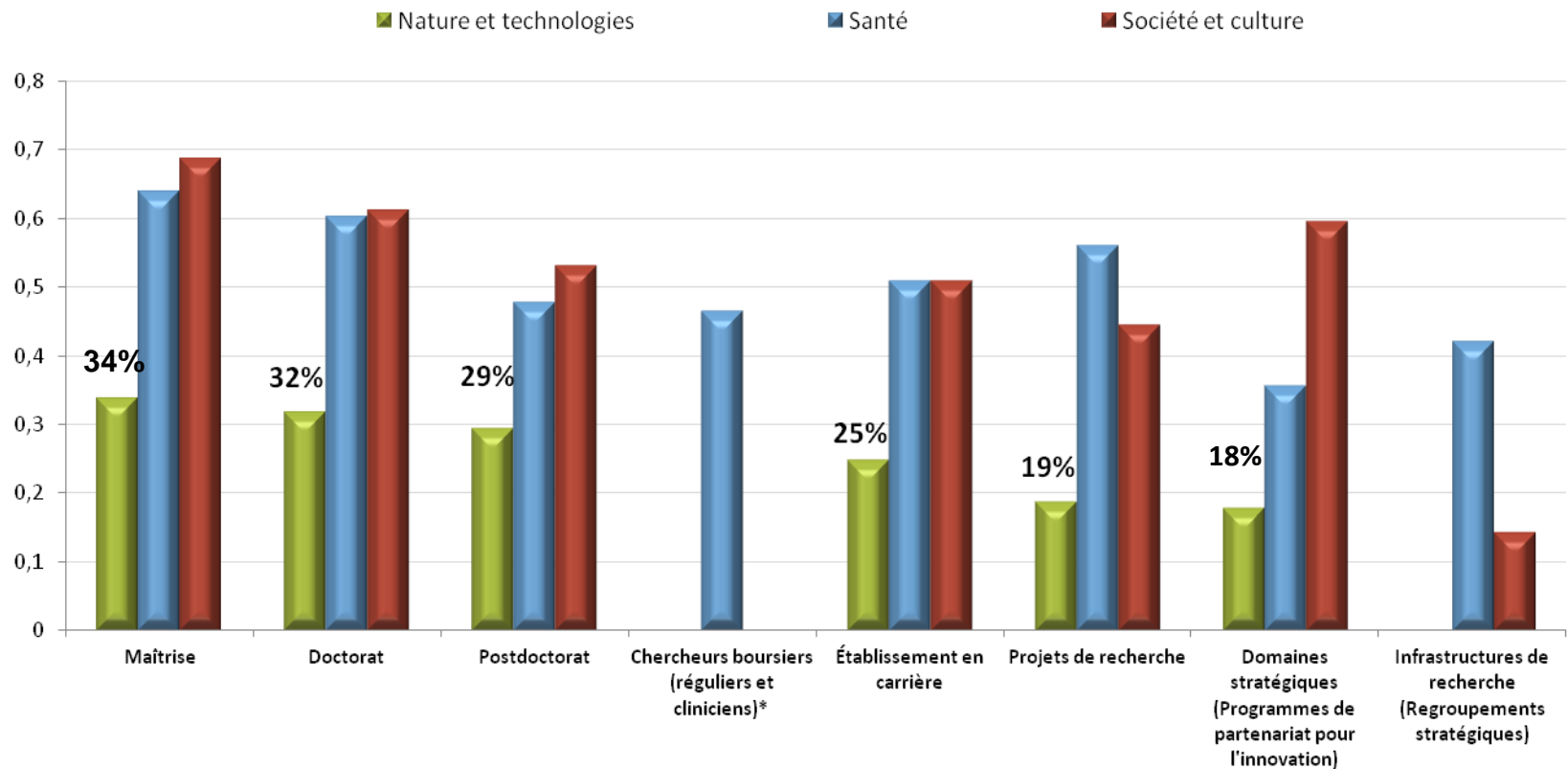
## **Percentage of Women and Men at Different Academic Levels in PCEM**

This graph depicts the percentage of women and men in physical sciences, computer science, engineering, and mathematics (PCEM) in 2008–2009 at various stages of the academic career in Canadian universities.

Source: Strengthening Canada's Research Capacity: The Gender Dimension, Council of Canadian Academies, 2012



# Share of women among the candidates in FRQ's programs (as PI), 2014-2015

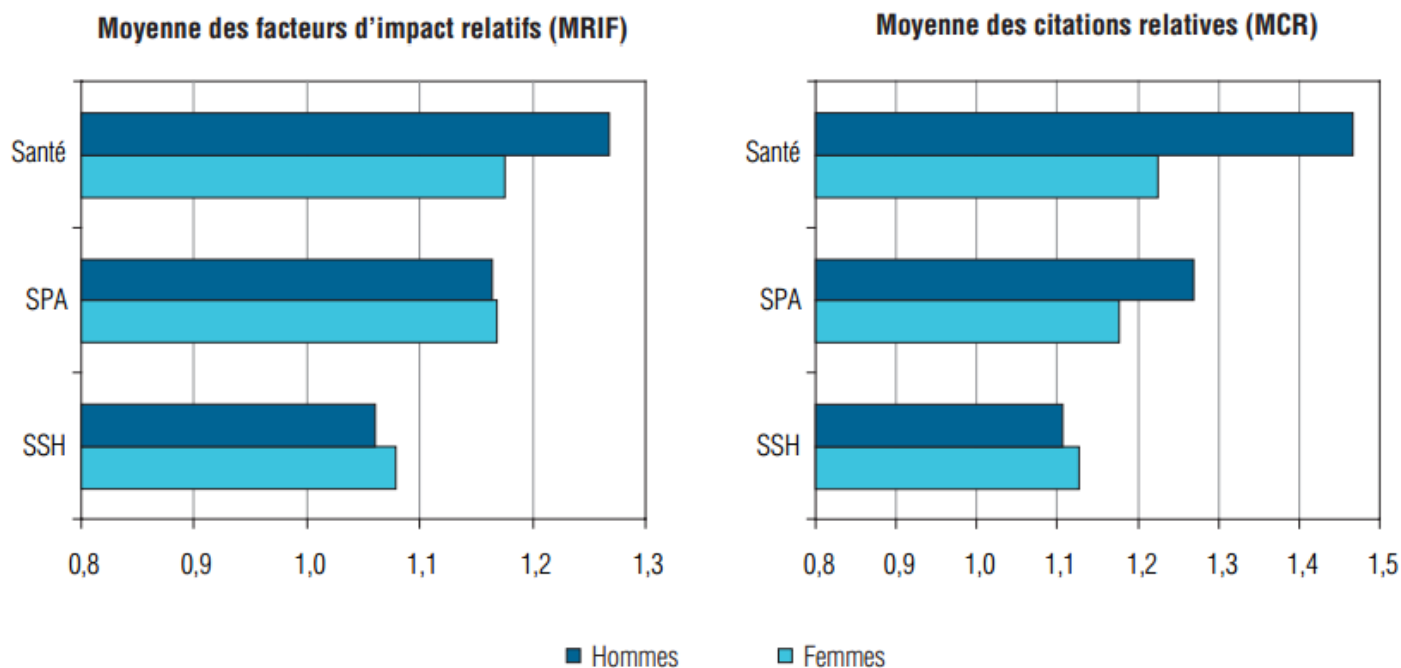


Source: FRQNT Annual Report 2014-2015

# Scientific impact of articles, by gender/all ages (2010)

Figure 5

**Impact scientifique des articles des professeurs-chercheurs québécois selon le genre et le domaine**



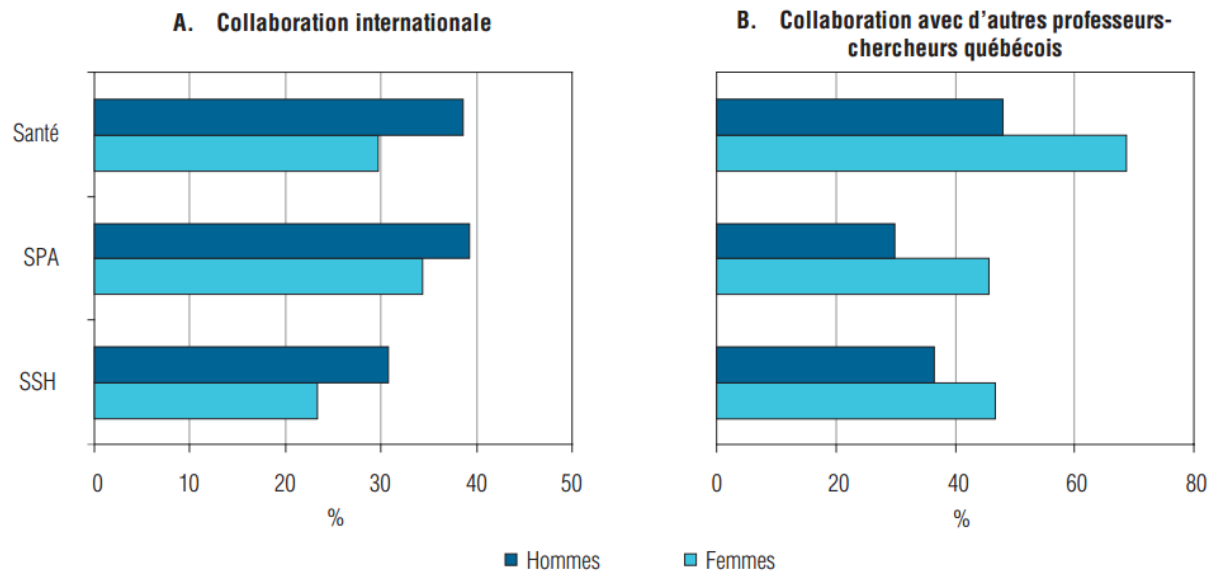
Sources : Web of Science® de Thomson Reuters©, Ministère du Développement économique, de l'Innovation et de l'Exportation du Québec, Fonds de la recherche en santé du Québec (FRSQ), Fonds québécois de recherche sur la société et la culture (FQRSC) et Fonds québécois de la recherche sur la nature et les technologies (FQRNT).

Compilations : Observatoire des sciences et des technologies.

# International collaborations, by gender and research field (2010)

Figure 4

Pourcentage des articles québécois écrits en collaboration, selon le genre et le domaine



**Women are more active than men in local collaborations , but not internationally, whatever the research sector**

Note : Les deux types de collaboration ne sont pas mutuellement exclusifs; un article pouvant à la fois être écrit en collaboration entre deux chercheurs québécois et un chercheur étranger.

Sources : Web of Science® de Thomson Reuters®, Ministère du Développement économique, de l'Innovation et de l'Exportation du Québec, Fonds de la recherche en santé du Québec (FRSQ), Fonds québécois de recherche sur la société et la culture (FQRSC) et Fonds québécois de la recherche sur la nature et les technologies (FQRNT).

Compilations : Observatoire des sciences et des technologies.

# WHY FEWER WOMEN?

- **drop out faster than men**
- **negative stereotypes can lower girls' aspirations**
- **Women's spatial skills are less developed than men's but these can consistently improve with a training course.**
- **Biases Limits Women's Progress in Scientific and Engineering Fields**

# More Reasons

- ***Chilly classroom climate*** for girls in school
- ***Too few female role models***
- ***A lack of “critical mass” of women*** in a department
- ***Bias and discrimination in hiring and advancement***
- ***Salary differences and low status***
- ***Issues of work-life balance***

**Some of our (Quebec) recent  
initiatives to go further**

# FRQ's initiatives for women

## **Postgraduate level:**

- Scholarships admissibility is prolonged by one year when the applicant has taken a parental leave
- If the parental leave occurs during the scholarship tenure, an eight-month paid leave is given to the candidate
- There is no limit to the number of parental leaves the applicant may have during the scholarship period
- Moreover, the scholar can pursue her graduate studies half-time if the institution allows such a practice
- Travel fees are covered for the whole family for PDFs.



# FRQ's initiatives for women

## **For all FRQ programs:**

- Expenses related to child care/guardianship during scientific meetings or field explorations are now admissible
- Some measures in FRQ's General Rules to support students and researchers (eg parental leave for maternity, paternity or adoption).

# Changes for equity gender

- Promote girls in STEM from primary school
- Continue to implement conditions to facilitative work-life balance. Provide support for the whole family in funding research programs
- Be more open to diversity in universities, by putting in place measures that will change (albeit slowly!!) deeply rooted institutional habits

# Plans for GS North America

## Montreal, Quebec, Canada, 6-8 November 2017

Maryse Lassonde, Directrice scientifique  
Fonds de recherche du Québec, nature et technologies

