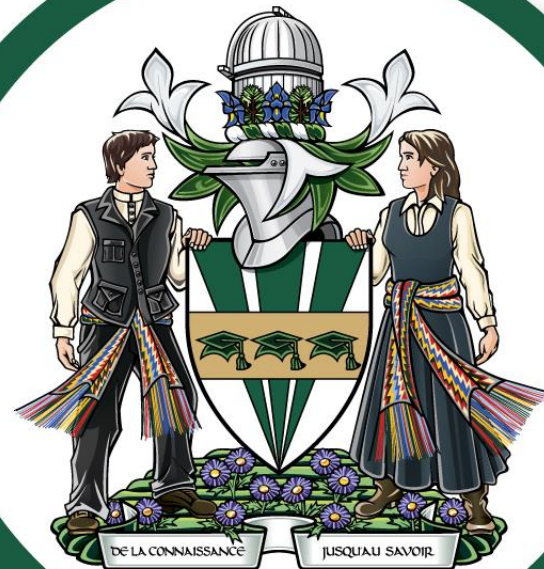


Positive Climate That Encourages the Recruitment of Femals in STEM

Prof. Nadia Ghazzali

NSERC-Industry Chair for Women in Science and Engineering in Quebec
Université du Québec à Trois-Rivières, Canada



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UQTR



Université du Québec
à Trois-Rivières

Outline

1. Some specific projects in Science and Engineering
2. Projects in the demystification of Mathematics
3. Factors linked to underrepresentation of women in Engineering
4. Conclusions



NSERC-Industry Chairs

Natural Sciences and Engineering Research Council of Canada (NSERC) established since 1997, five regional NSERC-Industry Chairs for women in Science and Engineering (CWSE)

- to increase the participation of women in Natural Science (Pure and Applied Sciences) and Engineering
- to provide role models for women active in, and considering, careers in these fields, within their respective regions.



Objectives of the Chairs

- Develop, implement, and communicate strategies to raise the level of participation of women in Science and Engineering as students, as professionals and as academia.
- Provide female role models who are accomplished, successful and recognized researchers in Science and Engineering
- Develop and implement a communication and networking strategy to ensure a regional and national impact on opportunities for women in Science and Engineering.



Chair Holders

In 2013, the five chair holders are:

- British Columbia and Yukon Territory, Prof. Elizabeth Croft, from the University of British Columbia
- Prairies, Prof. Annemieke Farenhorst, from the University of Manitoba
- Ontario, Prof. Catherine Mavriplis, from the University of Ottawa,
- Quebec, Prof. Nadia Ghazzali, from Université du Québec à Trois-Rivières
- Atlantic, Prof. Tamara Franz-Odendaal, from Mount Saint Vincent University



“Les filles et les sciences, un duo électrisant!” (*Girls and sciences, an electrifying duo!*)

One day event, for girls from grades 8 and 9, a unique opportunity to discover the exciting careers in Science and Technology, through activities, discussions and experimentation workshops.

- Workshops in the morning (perfumes, math, etc.)
- “Magasine ton avenir” (*Shop your future*) on lunch break
- Science creative activity in the afternoon



“Future Ingénieure?”

(*Future Woman Engineer?*)

- activity to demystify the engineering profession, for grade 12 students, by spending four hours to a day with an engineer or a group of engineers, in the field of their choice
- initiated by the Marianne-Mareschal Chair,
- in collaboration with the Montreal Polytechnique
- *The OIQ Professional and Engineers of Quebec*
- and the NSERC-Industrial Alliance Chair, in Quebec



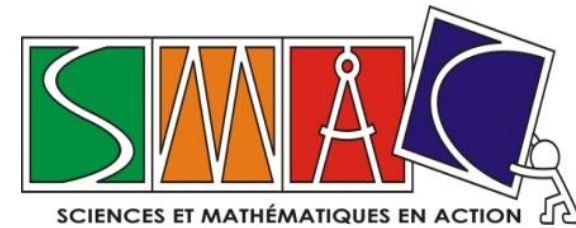
“Future Ingénieure?”

(Future Woman Engineer?)

- Visits held in winter, January or February, just before the end of the main application period in universities in Quebec
- in Quebec City, in 2009, 12 students were matched to six businesses and research centers:
 - DESSAU,
 - Research Group in Hydraulic Turbines of Laval University,
 - Hydro-Quebec,
 - Research Group for Defense Canada,
 - Ministry of Transportation of Quebec,
 - BPR-Bechtel.



SMAC Mission



Started in 2005

Arouse and reinforce the interest of teenagers for mathematics and sciences and demystify mathematics for the general public (www.smac.ulaval.ca/en)

- *Show Math*
- *MathAmaze*



show math

- Multimedia Show (www.mat.ulaval.ca)
- More than 100 shows since its beginnings
- More than **32 000** teenagers the show



- Show Math in Class : Free Educationnal Kit
- Can be downloaded from SMAC website (smac.ulaval.ca)
- Was requested by teachers
- Created to deepen the students understanding of topics covered by the shows
- Written by a team of collaborators; teachers, graphic designers, etc.



MathAmaze Math en jeu

- Internet Game
- FREE
- 3200 questions
- Available for all users, from 6 to 99 years old!
- **Homework driven platform for teachers**
- Mathamaze.ca





Math en jeu - Mozilla Firefox
<http://mathenjeu.mat.ulaval.ca/mathenjeu/flash/pop-up.php>

MathA-maze Math En jeu

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Pointages

1	mhped11	2
2	Jack	0
3	Steve	0
4	Doug	0

Mes objets: [Apple] [Book] [Banana] [Mushroom]

Contrôles du jeu: [Magnifying Glass] [Left Arrow] [Right Arrow] [Music Note] [Speaker]

Bienvenue à Math en jeu! Cliquez sur une case jaune pour le déplacer.

Transfert des données depuis mathenjeu.mat.ulaval.ca...

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Underrepresentation of women in Engineering

- Ghazzali and Myrand (2009)
 - “Facteurs liés à la faible présence des femmes en génie”
(*Factors linked to the underrepresentation of women in Engineering*)
 - to identify the exclusion and self-exclusion factors, which could explain this underrepresentation.



Factors- underrepresentation of women in Engineering

- School Environment
- Family Environment
- Stereotypes
- Workplace culture, values, climate and labour relations
- Work-family balance
- Discrimination



Institutional and social mechanisms of exclusion and self-exclusion

	In high school	In the University	In the Workplace
Institutional/social mechanisms of exclusion (explicit or subtle)	<ul style="list-style-type: none"> ◆ loss of interest for mathematics and physics (14-15 years old) ◆ dropout for boys ◆ learning strategies between boys and girls ◆ influence of school staff and parents 	<ul style="list-style-type: none"> ◆ lack of personal financial resources or of adequate child care ◆ expectations of society different than towards men ◆ biological clock ◆ subtle discrimination 	<ul style="list-style-type: none"> ◆ work-family balance ◆ expectations (availability, mobility) ◆ biases ◆ emphasize on valuing men' work ◆ weak institutional support ◆ Glass ceiling
Mechanisms of self-exclusion	<ul style="list-style-type: none"> ◆ misunderstanding the occupations ◆ lack of role models ◆ sensitivity to biases and friends 	<ul style="list-style-type: none"> ◆ stereotypes ◆ self-actualization ◆ individual aspirations (weak sense of purpose) 	<ul style="list-style-type: none"> ◆ environment reflecting competition values (power fights) ◆ Identity conflict



Conclusions

- All projects focusing around two major poles: attraction and retention
 - Attraction:
 - ✓ efforts are mainly needed for the image problem surrounding the profession and the Engineering field.
 - ✓ As well, a work of education and promotion has to focus on highlighting the various types of engineers.
 - ✓ The Engineering community also has to promote the various faces of the work and reality of engineers.
 - ✓ Organizations have to make sure that their corporate image reflects the diversity policies



Conclusions

- All projects focusing around two major poles: attraction and retention
 - Retention:
 - ✓ to provide more female role models, fostering a culture of diversity and respect for differences, and finally, proposing various, adapted work-family balance policies
 - ✓ Organisations have to focus on listening to the specific needs of women. There is as well a necessity to increase awareness of the whole community to the adverse effects of subtle and explicit discrimination



Thank you

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CHAIRE CRSNG | INDUSTRIELLE ALLIANCE

pour les femmes en sciences
et en génie au Québec

