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MAXIMIZING OPPORTUNITIES

Increasing Women's Participation In Science And Engineering – **A Summit**

A Report on Summit Outcomes
May 2011

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EXECUTIVE SUMMARY

On November 16, 2010, the Natural Sciences and Engineering Research Council of Canada (NSERC), with support from Engineers Canada and Research In Motion, brought together leaders from universities, colleges and the private sector with policy makers and students for the first "Maximizing Opportunities: Increasing Women's Participation in Science and Engineering – A Summit."

The event also saw the release of NSERC's report, *Women in Science and Engineering in Canada*.

The goals of the Summit were to:

- examine what businesses and colleges and universities are doing to attract women to careers in science and engineering and retain them; and
- discuss what works and outline the steps organizations should take to encourage more women to choose careers in science and engineering and retain those they hire.

The Summit's panel presentations, discussions and Ideas Lab provided a forum for sharing a wide range of current initiatives, best practices and policies. Panellists and Summit participants shared innovative ideas on how to improve current processes, policies and guidelines, as well as how to implement new ones.

The Summit demonstrated the clear need for sustained efforts to foster the participation and retention of women in the fields of science and engineering. Participants suggested that future meetings should consider other aspects of the issue, such as hearing the perspectives of young people or working in partnership with senior academic administrators to develop solutions.

NSERC will pursue a number of action items that emerged from the discussions. These are grouped under the Summit's three main goals:

Goal 1: Increasing the number and percentage of women in science and engineering

NSERC will revise and post its policy statement and publish competition results by gender to show numbers and performance.

Goal 2: Facilitate the accommodation of career and family

NSERC will make existing policies better known (e.g., deferring or extending research grants to accommodate parental leave). NSERC will also review its policy on leave to care for aging parents.

Goal 3: Nurture leadership

NSERC will, in partnership with others, provide additional resources to Chairs for Women in Science and Engineering to enable them to hire a postdoctoral fellow or research engineer to sustain their research program, freeing them to devote more time to Chair activities.

NSERC will also allow holders of Industrial Research Chairs and high-value Collaborative Research and Development Grants to claim leadership training as a research expense. It will also allow project management expenses on high-value prizes, such as the E.W.R. Steacie Memorial Fellowships and Brockhouse Canada Prize for Interdisciplinary Research in Science and Engineering.

NSERC will encourage leadership opportunities for women researchers and celebrate their successes. It will also encourage the nomination of women for prizes in research excellence and provide increased exposure for women through its communication activities.

INTRODUCTION

On November 16, 2010, the Natural Sciences and Engineering Research Council of Canada (NSERC), with support from Engineers Canada and Research In Motion, brought together leaders from universities, colleges, the private sector, policy makers and students for the first "Maximizing Opportunities: Increasing Women's Participation in Science and Engineering - A Summit."

The NSERC report entitled *Women in Science and Engineering in Canada* was also presented at the Summit.

The goals of the Summit were to:

- examine what businesses and colleges and universities are doing to attract women to careers in science and engineering and retain them; and
- discuss what works and outline steps to encourage more women to choose careers in science and engineering and retain those they hire.

Suzanne Fortier, President of NSERC, opened the summit with remarks emphasizing the importance of creating more opportunities for women in science and engineering. She said NSERC is concerned about women's under-representation in these fields and encouraged participants to identify current best practices and develop innovative ways to attract women to these careers and retain them.

Isabelle Blain, NSERC's Vice-President, Research Grants and Scholarships Directorate, provided an overview of NSERC's initiatives to increase women's participation in science and engineering. She then proposed new action to achieve the following three main goals:

1. Increase the number and percentage of women in science and engineering
2. Facilitate the accommodation of career and family
3. Nurture leadership

Ms. Blain highlighted a new NSERC initiative featuring additional funding for NSERC's Chairs for Women in Science and Engineering Program (CWSE)[1]. This initiative will provide Chairs with additional resources to hire a postdoctoral fellow or research engineer to sustain their research program, freeing them to devote more time to Chair activities.

Danielle Ménard, NSERC's Associate Vice-President, Corporate Planning and Policy, then presented a summary of key facts and statistics found in NSERC's report, *Women in Science and Engineering in Canada*.

The following summarizes the outcomes of the Summit's three discussion panels, the luncheon keynote presentation, and the Ideas Lab sessions.

[1] The Chairs for Women in Science and Engineering Program (CWSE) was launched in 1996 to increase the participation of women in science and engineering, and to provide role models for women active in, and considering, careers in these fields.

PANEL 1: Best Practices – Who's leading the pack in Canada and internationally, and why?

Moderator: Barbara Sherwood Lollar, Professor, University of Toronto and NSERC Council Member

Panellists: Nadia Ghazzali, Professor, Department of Mathematics and Statistics, Université Laval; Kelly Mack, Program Director, ADVANCE, National Science Foundation; and Howard Alper, Chair, Science, Technology and Innovation Council

Nadia Ghazzali discussed the initiatives of the five NSERC Chairs for Women in Science and Engineering and a number of international initiatives, including the International Network of Women Engineers and Scientists (INWES), which helps establish local associations for women in science, technology, engineering and mathematics.

Kelly Mack of the U.S. National Science Foundation (NSF) presented a summary of the NSF's ADVANCE program, which was launched in 2001 to increase the participation and advancement of women in academic science and engineering careers. The program funds diverse projects that include Partnerships in Adaptation, Implementation and Dissemination (PAID); Institutional Transformation Catalysts (IT-Catalysts); and Institutional Transformation Awards. Since 2001, the NSF has invested more than $130 million in ADVANCE projects. Ms. Mack discussed ADVANCE best practices and provided examples of the program's achievements.

Howard Alper discussed the importance of encouraging girls to consider careers in science, engineering and technology at an early age. He discussed several programs. These included the Women in Science, Engineering and Technology (WISET) exchange programs with the science council of Japan and two related initiatives, the Athena Forum in the United Kingdom and the Organization for Women in Science for the Developing World (OWSDW), a global organization based in Trieste, Italy. The Athena Forum focuses on women's career progression and participation in science, technology,

engineering, mathematics and medicine, while the OWSDW works to strengthen the role of women in development and promote their leadership in science and technology.

Key discussion points

The following key points were made during the discussion following the presentation:

- Further disaggregation and analysis of data could help identify gaps and specific trends.
- The importance of encouraging girls to consider careers in science, engineering and technology at an early age (well before Grade 8) cannot be overstated. Key to this effort is communicating with parents and providing teachers and guidance counsellors with tools to help identify gifted female students.
- Mentorship plays an important role in encouraging girls to consider careers in science, engineering and technology and should not be overlooked.
- Barriers to girls and women vary among disciplines. Efforts to remove these barriers should be tailored to specific disciplines.
- Efforts to interest girls in careers in science and engineering should harness technology and the tools of social media, such as Twitter and Facebook.

PANEL 2: Who's Where on Campus? How can we promote greater representation of women in science and engineering (policies, culture, hiring)?

Moderator: Elizabeth Cannon, President and Vice-Chancellor, University of Calgary

Panellists: Kimberly Woodhouse, Dean, Faculty of Engineering and Applied Science, Queen's University; Ruby Heap, Professor and Associate Vice President - Research, University of Ottawa; Simon Peacock, Dean of Science, University of British Columbia; Annette Trimbee, Deputy Minister, Ministry of Advanced Education and Technology, Government of Alberta

Kimberly Woodhouse discussed the practices and strategies of the engineering faculties at Queen's University and the University of Toronto, which focus on knowing where the women are, recruiting actively, and hiring based on quality and competitive strength. She highlighted the increasing need to provide spousal support and presented video clips that are used in Queen's strategy to recruit female students. This strategy has increased the percentage of female students in first year engineering from 23 percent to 28 percent in two years (2008 to 2010).

Ruby Heap underlined the importance of making the best use of existing assets, such as the Canada Research Chairs program. She emphasized the need to develop mentorship programs and foster more interdisciplinary research on gender and science and engineering in Canada.

Simon Peacock summarized the key recommendations of the University of British Columbia's May 2007 report, *An Assessment of the Working Climate for Science Faculty at UBC*. Key points included the need to set priorities and establish departmental policies that provide parental support, reduce teaching load and establish effective mentoring programs. The report also called for the Dean to oversee faculty hiring, as well as effective executive search and marketing tools to provide a large and diversified pool of applicants.

Annette Trimbee discussed the stereotype of the top performer, how best to describe today's learners and how this is not in line with the current reward system. Part of the solution could be greater accommodation of today's non-linear learners and accommodating "late bloomers" - both male and female.

Key discussion points

The following key points were made during the discussion following the presentation:

- It is important to innovate and create greater connectivity while building on current practices and opportunities.
- Mentoring is one of the best ways to keep female students in an academic career. A good mentor will foster talent and can be either male or female.
- Students should be exposed to new communities and encouraged to interact with these communities.
- Balancing growing career responsibilities requires choosing priorities carefully and pursuing those that are most important. Time management strategies are essential.
- Policies and practices need to be people-friendly, not just women-friendly.

Luncheon Keynote Speaker

Lili-Anna Pereša, Executive Director, ONE DROP

In her remarks, Ms. Pereša talked about her journey from engineering to international development and described how her training as an engineer contributed to her successful career in the international aid sector.

PANEL 3: ***How to spot talent and enable success?***

Moderator: Hiromi Matsui, Community Liaison Advisor, Interdisciplinary Research in the Mathematical and Computational Sciences, Simon Fraser University

Panellists: Chantal Guay, CEO, Engineers Canada; Ilse Treurnicht, CEO, MaRS Discovery District; and Dr. Sue Abu-Hakima, CEO, Amika Mobile Corporation

This panel featured an open discussion among panellists and Summit participants, with discussion sparked by the question: How to spot talent and enable success?

Panellists agreed on the need to engage female students early and that female secondary school students should be exposed to women entrepreneurs, who could serve as role models.

They also agreed that non-linear career paths work for some, but it is also necessary to foster talent and help women prepare for the corporate world. Qualities needed for success include strong communication skills, flexibility, and the ability to adapt to rapid change. The entrepreneurial world does not readily accommodate women, as shown by the lack of women technology entrepreneurs and venture capital partners. Those in leadership positions must be convinced of the value of diversity and persuaded to embrace change.

IDEAS LAB

Panellists and Summit participants took part in an Ideas Lab. Each table was assigned one of three questions, and participants were asked to brainstorm ideas related to each overarching theme. The questions and a summary of the responses follow.

Q. How can careers in research in general and information technology specifically be marketed to women? How can universities partner with the private sector to deliver this message to the undergraduate classes of 2012, 2014 and 2018?

Demystify and market careers in science, engineering and information technology

Summit participants indicated that there is a need to show women that a background in science, engineering or information technology can lead to a career that makes a contribution to society.

There is also a need to demonstrate the connection between a conventional education in science and engineering and a career that makes a contribution to society. Highlighting the paths leading to careers in both conventional science and engineering and fields outside of these areas was suggested as a solution.

Publicizing examples of welcoming, flexible and respectful workplaces will help to interest girls and women in careers in science and engineering.

Celebrate successes

Canada has many examples of successful outreach programs where universities, colleges and industries partner to recruit women students to science and engineering, and provide positive role models and inviting workplaces. These universities, colleges and industries should be celebrated in a Top 10 list. This information should be collected and publicized, either on NSERC's Web site or on an NSERC-sponsored Web site, blog or YouTube channel.

Show students how they can use their education

Start now to introduce 2012 graduates to programs that illustrate how they can apply their education in science and engineering. Foster programs that bring students to industry, such as co-op or job shadowing, or bring industry role models to the classroom. Bring 2012 graduates back to the classroom as role models for 2014 graduates, 2014 graduates as role models for 2018 graduates, and so on for future classes. Refine the message as the program evolves.

Sponsor talks to undergraduates by science and engineering graduates

Aim to have "one speaker per seminar" to present careers in science and engineering. Speakers could be NSERC-funded university graduates or researchers.

Educate the educators

Teachers and high school guidance counsellors play an important role in encouraging female students to consider careers in science and engineering. They need to be informed of the many opportunities for women in science and engineering. NSERC's regional offices could play a role.

Present a broad range of role models.

Present both women and men as professional role models, and not just those who are star performers.

Q. The lack of women in leadership roles is not limited to science and engineering. Just three of the G20 leaders and 13 of the Fortune 500 company CEOs are women. What initiatives are being taken in other disciplines, such as law or medicine, to correct this imbalance?

Engage women

Women want to make a difference and have a strong connection to community. There is a clear need to demonstrate how women in science and engineering are making an impact. It was suggested that work could be done to create more connections by bringing the lab to the community, not just to women in academic settings.

Leadership means different things to different people and there is a need to recognize different leadership skills and models. For example, volunteering is viewed differently in different communities.

Engage young people

Summit participants highlighted the need to provide all children with an understanding of leadership. Mentoring should be encouraged, and role models should be drawn from all age groups.

There is also a need to adopt innovative ways to get knowledge out to young people. Since they learn and share online, social-media tools such as Facebook and YouTube should be used to build awareness.

Finally, encouraging public service activities in colleges, universities and the private sector was seen as a clear next step. This can be addressed by increasing the number of women on boards and in leadership positions; developing an appreciation of breadth of learning not just depth; and facilitating, connecting and insisting on gender diversity.

Consider the experience of other countries

In some cultures and countries, engineers are held in higher esteem than in our own. In Kuwait, more women are engineers than men.

Late bloomers should be encouraged to take charge, identify and foster talent.

Q. Some women would say it is difficult to reconcile being a mother with being a top academic scientist or engineer. Identify three messages geared to university students to address this concern.

There are many examples of successful scientists and engineers who are mothers. It is important to establish that it is acceptable to have a rewarding and successful career that may not be stellar. Individuals must decide what they are willing to commit to and accept the consequences of their choice. Balancing priorities is key.

Organizations can help women balance the demands of family and career by offering opportunities for part-time research and by recognizing non-academic achievements and contributions.

For example, in 2003, the British Royal Society established the Rosalind Franklin Award as part of its efforts to promote women in science, technology, engineering and mathematics. The award is made to an individual for an outstanding contribution in any area of the natural sciences, engineering, technology and mathematics. Perhaps this could be adapted in Canada.

Academic institutions should also foster a sense of community with increased social interactions for faculty, students and postdoctoral fellows and expanded access to family support services, including childcare and affordable housing. Parental leave policies, new or expanded, should be publicized.

Organizations need to treat scientists and engineers as entrepreneurs. They should train and mentor women on the techniques of effective negotiation, which will help to develop a negotiation culture in the organization.

A survey of best practices that encourage a balance between family and career should be undertaken and the results shared with the community. NSERC should set standards and provide examples that others can follow, with an emphasis on flexibility.

Organizations should offer grants and support to faculty, students and postdoctoral fellows to allow their families to accompany them on field assignments.

NSERC provides parental leave for students, but not all students have NSERC scholarships or grants. Universities should consider creating a similar program to close this gap, and NSERC should continue to encourage universities to develop supportive policies.