Executive Summary

“Joining WiSE Conversations: Strategies & Successes from CWSE-ON” is a record of initiatives undertaken by Professor Valerie Davidson and her team as part of the Chair for Women in Science and Engineering - Ontario (CWSE-ON) program. The CWSE-ON program aimed to encourage young women into post-secondary programs in science and engineering, and to retain them as valuable contributors to professions in these fields.

CWSE-ON initiatives are described in three sections by audience: Early Enthusiasts, Interested Intellectuals and Productive Professionals. Each section outlines activities, describes results, highlights the essential collaborations, and indicates sources for the knowledge and resources that were developed.

CWSE-ON strategies included engaging with those adults who influence young girls (e.g. parents, teachers, Girl Guide leaders), collaborating with groups that have similar goals, inspiring girls and women through role models, and advocating to leaders and the public. This report emphasizes the value of conversations and collaborations, the networks tapped and created, and the need for change – change in ways of thinking, in education and workplace culture. Through these efforts, there will be change in the participation rate of women in science and engineering, particularly those in the next generation of students, professionals and leaders.

The CWSE-ON program was supported by NSERC, Hewlett-Packard Canada (2003-2008), Research in Motion (2008-2011) and the University of Guelph.

PHOTO CREDITS – Angela Catford, Valerie Davidson, Catherine Mavriplis, Professional Engineers Ontario (Barry Roden), Madeleine Ross, Martin Schwalbe, Warren Slater, Rohini Wittke.
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Joining WiSE Conversations:
STRATEGIES & SUCCESSES
FROM CWSE-ON
2003-2011

Cover Artwork

Bell, Vanessa: 
Conversation, 1913 - 1916
Oil on canvas, 86.6 x 81 cm

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This introduction provides some context for my opinions on ways to increase the participation of women in science and engineering in Canada. My training and professional career have spanned forty years - which means that when I enrolled in engineering there were very few women in my undergraduate classes and even fewer in graduate school. Furthermore, there were no female professors as role models along my path. I realize that from the age of 11, I have not had a female teacher for science, mathematics or engineering classes.

At an early age my parents made sure I knew that the doors to a university education would be open. Mentors were key influences on my decision to pursue graduate studies and to continue on a career path where I did not meet many women. My early mentors were male and they understood the culture – academic and professional – in ways that my family did not. They encouraged me to recognize my strengths and to follow my own path. As a result, I have spent most of my professional life in the academic world as an educator and a researcher.

In 2007, I was invited to make a plenary address at a Royal Society of Canada Conference “Rooms of their Own – Women in the Knowledge Economy and Society”. The conference theme created an opportunity for me to re-visit Virginia Woolf’s essay “A Room of One’s Own” and use her observations about the obstacles and prejudices that hindered women writers to open up a conversation about some of the current issues for women in science and engineering.
Woolf saw the writer’s need for a room of one’s own as a way to facilitate the creative process. In contrast, the professional lives of most scientists and engineers are spent in laboratories, design offices and field sites. Our norm is to work together. Since my professional work relies on networks, I instinctively consulted with colleagues as I prepared for the plenary talk. One person suggested that I read about the close relationship between Virginia and Vanessa Bell, her sister. Bell’s painting “A Conversation”, showing three women rapt in discussion, made me think about the nature of conversations among women and the value of networks that enable diverse conversations – particularly when they take us outside of our familiar rooms.

As a university professor, I participate in and contribute to a privileged knowledge society. Teaching and research are creative activities that provide a considerable amount of personal satisfaction. Although the overall participation of women in post-secondary education has increased substantially since Virginia wrote her essay, in 1929, it has taken the academy much longer to wonder about women’s under-representation in certain rooms of science and engineering. The Chair for Women in Science and Engineering (CWSE) has allowed me to participate in broader conversations and to focus on activities to increase the participation of women, particularly those in the next generation of students, professionals and leaders who may not have an implicit invitation to participate in the knowledge society as I did.

The CWSE-ON program has been shaped by my vision of a science and engineering culture that supports the educational and career goals of all and that benefits from the contributions of a diverse group of people. By continuing to inform, engage, collaborate, inspire, and advocate for girls and women, we can move closer to realizing these goals.

Valerie Davidson
BUILDING THE CWSE-ON PROGRAM

The Natural Sciences and Engineering Research Council of Canada (NSERC) created the program of five regional Chairs for Women in Science and Engineering in 1996. The program mandate is broad and addresses both the need to encourage girls and women into science and engineering programs, and the retention of women as valuable contributors to science and engineering. The Chairs deliver and support innovative outreach, research, networking and advocacy initiatives.

Valerie Davidson was awarded the Ontario Chair for Women in Science and Engineering in 2003 with support from NSERC, Hewlett-Packard (HP) Canada and the University of Guelph. A renewal term began in 2008 with Research in Motion (RIM) as the industrial partner. Together with staff, she developed a broad program of activities – CWSE-ON. The CWSE-ON program has focused on key connections with girls and women at different educational and career stages.

RESULTS

Overall participation numbers are shown in the graph on the next page.

CWSE-ON connected with many students – females and males – through classroom and community workshops. The results from 2004-05 reflect the positive impact of funding from the Ontario Women’s Directorate’s Partners for Change program to develop and deliver workshops.

The total number of participants included students, volunteers, parents and community collaborators and every year female participants were in the majority.

AUDIENCES

Early Enthusiasts describes students in elementary and secondary school.

Interested Intellectuals refers to those women in undergraduate and graduate studies who are preparing for further education or careers in science and technology.

Productive Professionals are women in science and technology professions, with a particular focus on women in the academy.

The sections that follow expand on the program activities and indicators of success for each of the three audiences.

2003-2011 CWSE-ON

33,600 female participants
COLLABORATORS

Sponsorship by NSERC, industry and the academy enabled eight years of activities. However, the CWSE-ON program could not have been realized without links to Val’s professional and personal networks and the many hours contributed by volunteers both in creating and coordinating activities and in acting as role models. (See Collaboration Map, pp. 6-7). Throughout the report, distinct icons identify collaborators from the academy or the community.

Particular thanks are due to the incredible women who worked as CWSE-ON staff – each one contributed unique skills, experience and energy to make the program successful on many levels. These individuals and many other volunteers and collaborators are acknowledged in Appendix I.

KNOWLEDGE MOBILIZATION

A knowledge mobilization framework is used to present the diverse contributions of the CWSE-ON program. Researchers in the social sciences and humanities define knowledge mobilization as a process to ensure that knowledge gathered through systematic study or experience is ready for understanding and use.

It is important to make resources and knowledge from the CWSE-ON program available for the benefit of girls and women, their communities or society at large. We have used this icon to highlight CWSE-ON materials now in a permanent digital repository. We hope that all members of the community – women in science and engineering and their advocates – can use these materials to continue to effect change.

CWSE-ON PARTICIPANT STATISTICS

Number of participants

Year

2003-04  04-05  05-06  06-07  07-08  08-09  09-10  10-11

Female students
Total students
Total participants

2003-2011 CWSE-ON 56,500 total participants
CWSE-ON Program
As NSERC Chair for Women in Science and Engineering (Ontario), Dr. Valerie Davidson acted as a role model and led a team of staff to organize and deliver the CWSE-ON program – with the aim of increasing the participation of women of all ages in science and engineering.
If we are to engage and inspire more women to participate, we have to convey the context – the creativity, excitement and teamwork that is involved in science and engineering.”

Valerie Davidson

EARLY ENTHUSIASTS

EARLY ENTHUSIASTS are students in elementary and secondary school. Many have the potential to succeed in Science, Engineering or Technology (SET) but only a small fraction of them choose to do so. Even those with a burgeoning interest will find it hard to sustain their engagement without positive support from their peers, their parents and the images and opinions they gather from society.

In order to support these students, we have to strengthen the quality of our connection with our audiences. The information we provide about the content of study and careers in science, engineering and information technology is important but not enough. The goal of our work was to spark interest in SET through hands-on experiments and design activities and to introduce role models who might inspire their thinking about pursuing post-secondary programs. Here are some highlights of the many ways that the CWSE-ON program worked to engage Early Enthusiasts as well as their teachers, leaders and parents.
ACTIVITIES
CLASSROOM TEAMWORK

READY SET GO! and CODES, COMPUTERS AND COMMUNICATING WITH ALIENS workshops are delivered by young women who are recent graduates from science and engineering programs.

As shown above, we travelled province-wide visiting more than 250 schools. 45% of the participants were students in rural and remote areas.

The presentations introduced students in Grades 7 to 12 to current examples of Scientists, Engineers and Technologists at study and at work. These classroom connections also included team-based activities such as the design of collapsible structures, wind turbines or computer code.

ENERGIZING TEAMWORK - JUST FOR GIRLS

Since 2005, ONWiE has coordinated Go ENG Girl/GÉNiales, les filles an annual event for girls in Grades 7 to 11. Program activities are led by engineering staff, faculty, students and alumnae. Student clubs like Engineers Without Borders participate in an information fair to highlight extracurricular activities. In 2010, an engineering badge day for Girl Guides was coordinated at five ONWiE locations. This program extends ONWiE’s outreach to a younger age group and the Girl Guides are encouraged to attend Go ENG Girl/GÉNiales, les filles when they are older.

WOW 2004, WISE Outreach Weekend, was a three-day residential program held at the University of Guelph for female students in Grade 10. One highlight of the weekend was a team-based project to design sensors and alarms to protect a “treasure”. The final challenge was for each team to try to get past the other teams’ security systems. Volunteers from the WISE student chapter led the technical and social activities.

ENTHUSIASTIC COMMUNITY TEAMWORK

GIRL GUIDES OF CANADA aims to enable girls “to be confident, resourceful and courageous” making it an ideal collaborator. CWSE-ON offered programs for Girl Guides and Pathfinders to earn science and technology badges, supported by volunteers from the WISE student chapter and CiSters.

ONWiE’s website provides current information on engineering programs as well as shared resources for members.

International Girl Guide camps – Guiding Mosaic 2006 and 2010 - were held at Guelph Lake. CWSE-ON staff and volunteers delivered workshops such as COSMETIC CHEMISTRY and SO YOU THINK YOUR ROBOT CAN DANCE for the Science and Technology programs at both camps.

As part of a professional development workshop entitled SCIENCE MADE SIMPLE, CWSE-ON staff developed teaching materials for the Science curriculum in Grades 5 and 6. The workshop was sponsored by RIM and held at the Perimeter Institute, Waterloo, ON in September 2010, with 41 elementary school teachers attending.

RESULTS

After classroom workshops female participants said...

“This changed my perspective about science.”

“I really enjoyed the fact that we got to do a hands-on activity instead of just talking about everything.”

“…. helped me a lot about how she [presenter] said she wasn’t great at math but if you try you can achieve anything “

“... found this presentation amazing!”

“I think it would be very cool to build things and help our world become a better place.”

“I really enjoyed it, the robots were cool and I learned a lot even though I don’t usually like science.”

ESTIMATES OF PARTICIPANTS IN ACTIVITIES FOR EARLY ENTHUSIASTS

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<thead>
<tr>
<th>PARTICIPANT GROUP</th>
<th>NUMBER OF PARTICIPANTS</th>
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</thead>
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<tr>
<td>Stakeholders</td>
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<tr>
<td>Female students (elementary and high school)</td>
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<tr>
<td>Total students (elementary and high school)</td>
<td>36,300</td>
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<tr>
<td>Teachers, parents &amp; community leaders</td>
<td>4,400</td>
</tr>
<tr>
<td>Role Models</td>
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<tr>
<td>Female undergraduate and graduate students</td>
<td>1,550</td>
</tr>
<tr>
<td>Faculty, staff &amp; community leaders</td>
<td>2,550</td>
</tr>
<tr>
<td>All Participants (male &amp; female; all categories)</td>
<td>45,200</td>
</tr>
</tbody>
</table>

PRE-WORKSHOP SURVEYS

Interest in Science & Engineering by Gender

- Interested
- Not sure
From teachers...
“I enjoyed seeing how students problem-solved. Thanks for challenging us to think about women seeking a career in engineering.”

“The workshop was great for both students and teachers alike.”

“I learned about] Variety of research and career opportunities in SET.”

“More evidence of connection between math and technology as it applies to students.”

After Go ENG Girl/GÉNIales, les filles participants said...
“GEG changed my view of engineering from nerdy and boring to fun and interesting.”

“On a appris que le génie n’est pas centré sur une seule chose.”

“I now realize that I don’t have to be super duper good at math to be a good engineer. Imagination is important.”

“Je voulais devenir docteure, maintenant le genie civil m’intéresse plus”

“I’ai aimé l’implication des bénévoles.”

2011 survey of past participants...
“I am going into engineering next year. Before Go ENG Girl I had no idea what engineering was all about :)”

“I am still unsure about my path but Go ENG Girl gave me some interest in taking Physics next year.”

 “[The event] led me towards the maths and sciences.”

“I was also able to experience the university campus life and I realized what a great place it was.”

“I am currently studying Mechanical Engineering - I did not choose to study this subject based solely on my experience at Go ENG Girl but it definitely sparked an interest in this field.”

From parents...
“Go Eng Girl c’est extraordinaire, vous faites la différence dans la vie de nos filles. Je vous encourage fortement à continuer cette activité.”

“Merci beaucoup de votre implication, vous faites toute la différence pour nos filles.”

“A big thank you to the Go Eng girl organizers for demonstrating that girls can be engineers too.”

5000 girls and their parents have attended Go ENG Girl/ GÉNIales, les filles at campuses across Ontario.

25% of the attendees are coming back for the second or third time.
Two years later
WOW participants said...

“I definitely have a better understanding and appreciation towards science and engineering due to the WOW weekend retreat.”

 “[The session] allowed me to see and explore other options. After the weekend retreat I actually changed courses and took the physics course at my school.”

From Girl Guide leaders...

“CWSE-ON involvement helped to enrich the science and technology workshops at two international Girl Guide Camps.”

“The hands-on portion was done extremely well and support from the workshop leaders was awesome.”

JUST FOR GIRLS EVENTS

Participants at CWSE-ON events funded by YSTOP completed surveys to assess change in interest in Science & Technology. More than 40% of the ~900 respondents indicated that the event had increased their interest. However, the analysis of responses by sex and type of event showed that a significantly higher proportion of participants in female-only events expressed increased interest in Science and Technology compared to females in mixed events.

CHANG IN SCIENCE & TECHNOLOGY
INTEREST POST-WORKSHOPS

66% of those students who gave feedback were more interested in engineering as a field of study or a career choice after participating in Go ENG Girl/GÉNIales, les filles.
COLLABORATION IMPACT OF TEAMWORK

SCIENCE AND TECHNOLOGY CONSORTIUM

The coordination of CWSE-ON, assisted by external funding from the Ontario Women’s Directorate and the Ministry of Research and Innovation, brought the Consortium members together. The reach of members’ activities was extended through collaboration with each other. e.g. Discover Engineering and CWSE-ON developed and delivered Ready SET Go! workshops around Ontario.

The ONTARIO DEANS OF ENGINEERING AND APPLIED SCIENCE provide financial and administrative support to local Go ENG Girl/GÉNIales, les filles events.

VOLUNTEERS

Volunteers are a vital part of the CWSE-ON program success. They contribute as role models, organizers and publicists. Activities have been supported by volunteer faculty, staff, students and alumnae from across the disciplines of science and engineering as well as other interested individuals.

Members of the Science and Technology Consortium tapped the pool of people in their communities who were interested in the goals of the program. e.g six Aboriginal women served as role models at community presentations and in a “WISE CAREERS” DVD that was used at career fairs and in schools.

Province-wide 360 volunteers (57% female) contributed to the Science and Technology Consortium. Over 1000 volunteers participated in “Go ENG Girl/GÉNIales, les filles” from 2005-2010.

COLLABORATORS EXTEND THE ACTIVITIES

Other groups doing outreach can benefit from the experience and materials developed through CWSE-ON and other network partners. Promotion and results from the Go ENG Girl workshops are posted on the ONWIE website. This includes a section featuring role models and a video that highlights engineering careers for students.

“Go ENG Girl showed me that engineering is an incredibly diverse field [...] and five years later, I’m partway through an aerospace degree and loving it!”
Val's goal was to share knowledge and resources developed by the CWSE-ON program to benefit others. Both research knowledge and experiential wisdom are worth passing on. During the CWSE-ON term resources could be found on the Chair’s website.

They are now stored in the Atrium.

HANDS-ON ACTIVITIES

- READY SET GO! WORKSHOPS
- CODES, COMPUTERS AND COMMUNICATING WITH ALIENS WORKSHOPS
- GIRL GUIDE BADGE DAYS/WORKSHOPS AT 2010 GUIDING MOSAIC CAMP
- COSMETIC CHEMISTRY GUIDE
- SO YOU THINK YOUR ROBOT CAN DANCE – VIDEO OF WORKSHOP
- WILD IN THE RAINFOREST WORKSHOP
- SCIENCE MADE SIMPLE™ WORKSHOP FOR ELEMENTARY SCHOOL EDUCATORS

CWSE-ON in-class workshops were promoted to teachers on the Chair’s website with a clear explanation of the links to the school curriculum.

RESOURCES FOR TEACHERS AND FOR FEMALE STUDENTS TO ENCOURAGE CAREER EXPLORATION

Girls4Science, a Facebook group for female high school students, recruited mentors to provide guidance and inspiration.

Videos of dancing robots from So You Think Your Robot Can Dance workshops at the Guiding Mosaic international camp are posted in Girls4Science.

VIDEO ABOUT CWSE-ON WORK, produced by Research in Motion, asked: How are women and girls reshaping the future? It was shown at the first TEDWomen conference, 2010.

A special section of the CWSE-ON site was created for Women in Computing resources, including a presentation describing the SUCCESS IN YOUTH OUTREACH workshop.
COMMUNICATIONS

Val and the CWSE-ON team connected with their audiences through the internet, television, radio, newspapers and journals to share CWSE-ON program expertise. In this way they mobilized knowledge, addressed current issues and ideas, and promoted new projects.

PRESENTATIONS

Val participated in many events as a role model and mentor for Early Enthusiasts. She also had conversations with parents, youth group leaders and teachers.

Creativity a big part of engineering, girls told

Girls urged to study math, sciences; Workshop aims to break stereotypes
In the early 1970s, when I decided to study engineering, it was an unusual choice for a woman. However the fact that men dominated this space was not going to prevent me from exploring it. I was confident in my ability to succeed academically and I came to realize that this path offered many opportunities.”

Valerie Davidson

INTERESTED INTELLECTUALS

INTERESTED INTELLECTUALS are the women in undergraduate and graduate studies who are preparing for further education or careers in science and technology. They have shown early interest by selecting the high school science and mathematics courses required for admission to post-secondary programs. However, in many university classrooms and laboratories, these women are in the minority. Although participation of women in post-secondary education is now at a national average of well over half of all undergraduates, women are still under-represented in Engineering (17.4%), Physics (22%) and Computer Science (14%) *. Moreover, there are relatively few female role models as classroom instructors or as research advisors in these disciplines.

Conversations are key to encouraging female students in undergraduate and graduate studies to complete their studies and to consider career opportunities in related areas. CWSE-ON activities connected Interested Intellectuals with mentors, role models and peers in ways that encouraged sharing of experiences. Research into their perceptions of the workplace provided an important foundation for the CWSE-ON program activities and for future work.

* 3.6% of undergraduate engineering students across Canada were female.
ACADEMIC BOOT CAMP is a two-day workshop for female graduate students and postdocs that was presented through the ONWiE network. Local university faculty and staff volunteers presented sessions on interview preparation, teaching and research advice. They also engaged with participants in open and frank discussions about the realities and advantages of an academic career. Val helped to develop the program and evaluation tools.

Female and male undergraduate and graduate students in science and engineering attended the Skills Portfolio Development Workshop. The students learned how to develop a personal skills portfolio – a tool to identify and reflect on skills in four broad areas of competency: managing self, communications, managing people and tasks, and mobilizing innovation and change.

PEDAGOGY
Val collaborated with Prof. Warren Stiver, NSERC Chair in Environmental Design Engineering, on a pedagogy project in a second-year design course. Students were observed in different learning environments (computer laboratories and machine shop). Surveys were used to monitor self-efficacy ratings in a number of course-related domains. Females reported lower self-efficacy in engaging in hands-on tasks in a machine shop. This was the only significant gender difference.

RESEARCH
Val contributed substantially to a Social Sciences and Humanities Research Council (SSHRC) research project, led by University of Guelph Psychology professor Karen Korabik. One part of the project was a national survey of graduate students in science and engineering to assess educational experiences and career intentions. The aim was to understand the factors that impact women's decisions to remain in science and engineering. The second part of the project focussed on building a major proposal for research funding from SSHRC.

2009 17.4% of undergraduate engineering students across Canada were female.
There is a significant correlation between retention of female graduate students and positive departmental climate and advisor support.\(^6\)

**ROLE MODELS, MENTORING & NETWORKS**

WiSE Connect funding was first used to send a graduate student to the Grace Hopper Celebration of Women in Computing in 2006. Four additional bursaries from CWSE-ON have been awarded to students to attend Grace Hopper conferences in subsequent years. These annual conferences held in the U.S. are designed to recognize the research and career interests of female computer scientists. Connection with role models is an added value. As Melanie Veltman, M. Sc. Computer Science, Guelph 2010, said after the 2008 event, "Women from Google and Intel with powerful careers came to talk to us and I felt that what I was doing was important."

WiSE Connect funding also provided opportunities for students to meet with role models and peers through travel bursaries to attend the biannual conferences of CCWESTT. CWSE-ON sponsorship enabled undergraduate students to attend forums organized by WEAC, the Women in Engineering Advisory Committee of OSPE. WiSE Connect funding supported a networking dinner with female graduate students, postdocs and professionals in advance of the Ontario Centre for Engineering and Public Policy conference in May 2010. Accommodation was also provided so that out-of-town students could attend the policy conference and continue networking.

“I thoroughly enjoyed the networking evening and the conference. Both were very inspiring and opened my eyes to many directions that I hadn’t really considered as typical paths for engineers. ... I learnt [sic] that engineers have valuable skills to contribute to a variety of areas, not just technical ones.”

WISE/OCEPP participant

To further enhance the opportunities available to Interested Intellectuals, Val mentored students and post-doctoral fellows in developing scholarship applications and in “WRITING WINNING RESEARCH PROPOSALS".
RESULTS
RESEARCH FINDINGS
In the 2010 national survey of final year students in computer science and engineering, female students reported generally positive educational experiences. However, in response to questions of expectations of the workplace in these fields, a majority of female respondents in both fields expected to face gender-based discrimination in the workplace.

From a participant...
“I am afraid to work in an environment where there are few women... where they do not adequately address gender concerns as legitimate, but rather [think] that I am a woman who does not know how to behave in a man’s world.”

Feedback from female participants...
“Learning about what skills undergraduates and employers see as needing the most improvements. Gives me a place to focus and make sure I am always improving these skills.”

“Leadership is what I need to improve and I got excellent information about it.”

“The idea of skills portfolio - perfect solution/answer to put all my experiences and skills together!”

Women who participated in the ACADEMIC BOOT CAMP programs in 2008 and 2009 appreciated the practical advice. The event increased their confidence and helped in clarifying goals about careers in academia.

“I realized that my interests are in teaching, guiding and managing. I’m very happy that I realized this and of course met such great, smart, motivated women.”

“Learned things about academic life/hiring process I did not know and would not have had an opportunity to learn otherwise.”

“The load of responsibilities is the major concern [about a career in academia] but now I think it is possible to handle it.”

Results from a post-workshop evaluation of the Skills Portfolio Development Workshop showed no significant difference in rating of the overall workshop based on gender.

Feedback from event surveys...
Post-Boot Camp Evaluations – All participants rated overall program between “Valuable” and Extremely Valuable.

Participating in the 2008 Skills Portfolio Development Workshop gave mean ratings of 4.4 for workshop quality and relevance (1 = poor and 5 = excellent).

ESTIMATES OF PARTICIPANTS IN ACTIVITIES FOR INTERESTED INTELLECTUALS

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<thead>
<tr>
<th>PARTICIPANT GROUP</th>
<th>NUMBER OF PARTICIPANTS</th>
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</thead>
<tbody>
<tr>
<td>Stakeholders</td>
<td></td>
</tr>
<tr>
<td>Female undergraduate students</td>
<td>1,850</td>
</tr>
<tr>
<td>Female graduate students</td>
<td>600</td>
</tr>
<tr>
<td>Role Models</td>
<td></td>
</tr>
<tr>
<td>Female faculty, staff and community volunteers</td>
<td>550</td>
</tr>
<tr>
<td>All Participants</td>
<td>5,025</td>
</tr>
<tr>
<td>(male &amp; female; all categories)</td>
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</tbody>
</table>
LEARNING FROM EXPERIENCE

CWSE-ON support and WiSE Connect funding helped female computer science students to find their places in the academy.

Alana Cordick, M. Sc. in Applied Computer Science (2010) was the first Guelph student to attend the Grace Hopper Celebration of Women in Computing. Alana experienced the thrill of “…working and making connections with other females who shared the same interest and passions that I did. It had a huge impact on me personally and professionally.” Through those experiences, Alana said she “realized that it was hard to find people to relate to when going through school and that I needed to bring [those experiences] back to the University of Guelph.” On her return, she founded a student club called CiSters.

CiSters made it possible for first year students to make a connection with female professors as role models and mentors.”

Alana Cordick

CiSters made it possible for first year students to make a connection with female professors as role models and mentors.”

Alana Cordick

picted above: Melanie Veltman (L) and Alana Cordick (R)

CWSE-ON support for Grace Hopper Celebrations helped kick-start CiSters and CWSE-ON staff helped with CiSters events. Some of these events – Pathfinder Badge Day, Gr8 Designs and Roboticon – linked computer science students with opportunities to become role models themselves to Early Enthusiasts.

Melanie Veltman had taken a two-year break from her undergraduate studies in computer science. When she came back, CiSters was there as a welcoming place. “I felt like I was valued for who I was – that I belonged there. I never felt welcomed before.” Melanie says that her ongoing work with CiSters has enabled her “to build my life experiences, my successes and my confidence.”

The numbers are shocking: women attain 58.2% of all undergraduate degrees in Canada, but only 13.9% of CIS degrees.” 2008’
For the first time I could take my skills and apply them to something I cared about.

pictured above: Prof. Cecilia Moloney CWSE Atlantic Region 2004-2009 at the CCWESTT conference

CWSE-ON seminars and the CCWESTT 2008 conference provided opportunities for students and faculty to get together for discussion and strategic thinking.

From a doctoral student,

“I thoroughly enjoyed how this conference brought together the key stakeholders together to discuss the issues. The opportunities to network and grow professionally were fantastic. However, there are times it felt like we were all preaching to the choir. The strategic planning session with the NSERC chair holders was fantastic and more sessions like that at future events is critical.”

20% of those who attended CCWESTT 2008 (Guelph) were undergraduate and graduate students.

COLLABORATION

Val led a multi-disciplinary team in the development of a major proposal for research funding from SSHRC. This unique collaboration started conversations among scientists, engineers and social scientists that deepened the understanding of research methods and issues. The project’s aim was to understand the persistent under-representation of women in natural sciences and engineering and to provide evidence-based practices and interventions to effect significant change.

This project brought together a national network of researchers that included the NATIONAL NETWORK CWSE®, researchers from the social sciences and humanities, NSERC®, CCWESTT® and Deans of Science and Engineering.

The final proposal was not funded by SSHRC but the initiative created ongoing alliances and contributed to the following projects:

• the career transitions surveys with senior undergraduate students
• the Skills Portfolio Development Workshop,
• the development of equity indicators for faculties of science and engineering.
Val was a compelling role model for Interested Intellectuals who comprised a significant portion of the audiences.

Some highlights:

- Keynote presentations at the 2005, 2006, and 2010 National Conferences on Women in Engineering organized by undergraduate students and “10 things I wish I knew before I graduated from engineering” at the 2008 event.

- Presentations at the Round Table conferences run by the McMaster University WiSE Initiative in 2006 and 2010.

- At the first Ontario Celebration of Women in Computing Conference 2010 at Queen’s University, a keynote presentation – “Outreach, Mentoring and Networking for Change.”

- Norma Slepecky Memorial Lecture to the general public and remarks at WISE Faculty Luncheon, Syracuse University, 2008

- “Promoting an Open & Positive Climate for Women in Science and Engineering”, Faculty of Engineering and Department of Electrical and Computer Engineering, University of Auckland, New Zealand, 2009.

Hello Valerie,
It was nice to finally meet you and the conference certainly exceeded all of our expectations. It truly was inspiring to be among so many passionate, intelligent and motivated women. Thank you for making that possible.”

uOttawa WISE
RESOURCES
During the CWSE-ON term, resources could be found on the Chair’s website. They are now stored in the Atrium.

Papers have been published on research themes related to the CWSE-ON program.

Darisi, T., V.J. Davidson, K. Korabik and S. Desmarais. "Commitment to Graduate Studies and Careers in Science and Engineering: Examining Women's and Men's Experiences." 2010


Power Point slides from a workshop on Communicating Effectively in Male Dominated Professions, at the 2010 Ontario Celebration of Women in Computing Conference.

COMMUNICATIONS
Articles in professional journals and in the media were used by Val and the CWSE-ON team to extend knowledge and understanding.

“Advocating Change, Examining the choices made by today’s women in science and engineering” by Jennifer Fender, CWSE-ON Project Manager, in Canadian Chemical News, February 2008.

Quoted in:
“Why more women aren’t becoming engineers.” Globe & Mail, 9 Nov. 2010.

“What Can Diversity Bring to Engineering?”, Engineering Dimensions, a publication of PEO.

CWSE-ON INTERNET PRESENCE
The CWSE-ON website connected to the websites of WiSE groups across Ontario and CiSters at University of Guelph.

Material supporting organization of an Academic Boot Camp is available on the ONWiE website.

The site was linked to a Facebook group for post-secondary women in science and engineering. Participants were encouraged to ask questions and to share ideas, experiences, plans and challenges. Student and professional mentors were available to answer questions.

A section on the site for Women in Computing included material on the status of women in ICT in Canada.
We cannot afford to lose the contributions of women because they need time to care for young children or aging parents. Structural and cultural practices that recognise and support individual choices are vital to success in recruitment and retention of women in science and engineering careers.”

Valerie Davidson

PRODUCTIVE PROFESSIONALS

PRODUCTIVE PROFESSIONALS are women who work in science and technology professions. Society and employers invest heavily in developing a talented workforce. Employers who recognize the need for short-term accommodations - those that allow flexibility in a career path and ways to transition back into the workplace - will be better able to retain their valuable employees, both women and men.

Universities employ scientists and engineers as researchers and teaching faculty. Val recognised the importance of increasing the representation of women in academic careers to serve as role models for female students and to take leadership roles in the academic community.

The CWSE-ON program is committed to understanding the current environment for women in science and engineering fields and to advancing positive changes. Key components of the strategy are to conduct relevant research, to share knowledge and successful practices through networks, and to advocate for change.
ACTIVITIES
COLLABORATIVE RESEARCH

The NATIONAL NETWORK CWSE used the SSHRC proposal as a springboard to develop research projects in two areas: career transitions of undergraduate and graduate students and institutional support provided by universities for academic work and family expectations.

Val led the INSTITUTIONAL INDICATORS RESEARCH project with the NATIONAL NETWORK CWSE to define national equity indicators for faculties of science and engineering. The over-arching goal was to develop benchmarks by which Canadian universities assess equity in terms of faculty recruitment, career progress and retention.

The CAREER INTENTIONS SURVEY involved undergraduate students in engineering and computer science who were about to graduate. This was a project of the NATIONAL NETWORK CWSE to examine students’ perception of the workplace and factors that influence career decisions. Survey responses were obtained in 2010 and 2011 from students across Canada.

The 2010 Survey of Working Conditions for Engineers was sponsored by CWSE-ON in collaboration with OSPE, ENGINEERS CANADA and PEO. The survey assessed issues related to mentoring, the impact of ‘unwritten rules’ in the workplace on both men and women, retention, experiences of perceived discrimination and the availability, use and impact of leaves. Val is working with the Women in Engineering Advisory Committee of OSPE and the Standing Committee on Women in Engineering of ENGINEERS CANADA on relevant issues.

VAL AS A ROLE MODEL AND ADVOCATE

CWSE-ON, in collaboration with Teaching Support Services at the UNIVERSITY OF GUELPH, held the Women in Academe Series, a monthly lunchtime session for female faculty, instructors, and graduate students. Each discussion session had a specific focus and was typically facilitated by one or two faculty, staff or graduate students. Topics included: Bullying in the Academic Environment, Leadership, Establishing Presence in the Classroom and Balancing Work and Family in the Academic Environment.

Val co-presented GENDER AND COMMUNICATION IN THE ENGINEERING FACULTY workshops to faculty, staff and administrators at two Ontario universities in 2006. The Gender Issues Training Kit of the workshop materials and a report about raising the awareness of engineering faculty members is posted on the OSPE website at the WEAC page.

Val was invited to deliver a plenary address at an international conference held to celebrate 125th anniversary of the Royal Society (Edmonton, 2007). Entitled, OUTSIDE OF OUR ROOMS: NETWORKING ACROSS THE ACADEMY, Val used her address to reach out across the academy to elaborate on the issues for women in science. At the same event, the NATIONAL NETWORK CWSE presented a
workshop “The Culture in Academic Science and Engineering Departments: Perspectives from Within and Suggestions for Change”.

The “Women in Engineering - Moving Up in Ontario” conference was geared to women at career midpoints in both the academic and private sectors. Valerie gave a presentation entitled Advancement of Women Engineers – A few indicators & observations and participated in the conference discussions.

Val presented the Networking Skills and Strategies workshop with Carolyn Emerson at the American Society of Mechanical Engineers Women and Minorities Workshop (International Design Engineering Technical Conference, Montreal 2010). Each participant developed action items for networking and effective communications to implement at the conference and back at the office.

Val represented Canada as a co-organizer of the “Advanced Leadership Conference”, Syracuse NY, 2004. This was one of six workshops modeled in the style of Gordon Conferences to discuss academic leadership. The overall objectives were to conduct leadership self-assessments and to broaden each individual’s thinking about leadership roles in institutional transformation. Valerie invited Suzanne Fortier to participate as a role model of a senior administrator.

The WiSE program at Syracuse University organized an international symposium on the status of women STEM faculty in 2010. Val was invited to make two presentations entitled: Status of Women STEM Faculty in Canada and Promising Institutional and Departmental Practices that Advance Women’s Careers in STEM: Some Canadian examples.

A significant proportion 63.3% of female respondents to the Career Intentions survey expect to face gender-based discrimination in the workplace, while only 5% of male respondents indicated similar concerns.
RESULTS
FEEDBACK FROM EVENT SURVEYS

The Women in Academe Series sessions were extremely popular and often there were waiting lists as the sessions were fully subscribed. Survey respondents indicated:

“This type of environment is ideal for sharing and talking on women’s careers in academia.”

“Listening to other women’s experiences, particularly those at a higher academic level [was most valuable]. It emphasized the importance of mentoring.”

After the GENDER AND COMMUNICATION IN THE ENGINEERING FACULTY workshops, the participants who completed evaluations reported that their understanding of gender differences as they apply to learning situations had increased – the mean rating was 3.7 on a 5 point scale (3 = somewhat and 5 = very much).

ESTIMATES OF PARTICIPANTS IN ACTIVITIES FOR PRODUCTIVE PROFESSIONALS

<table>
<thead>
<tr>
<th>PARTICIPANT GROUP</th>
<th>NUMBER OF PARTICIPANTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholders</td>
<td></td>
</tr>
<tr>
<td>Female faculty</td>
<td>700</td>
</tr>
<tr>
<td>Female professionals outside the academy</td>
<td>2,725</td>
</tr>
<tr>
<td>All Participants (male &amp; female)</td>
<td>6,200</td>
</tr>
</tbody>
</table>

IMPACT OF ADVOCACY AND NETWORKING

The “Moving Up” conference in Ottawa was an opportunity for mid-career women engineers to compare career strategies and leadership opportunities in university, industry and government sectors. It also enabled Val to collaborate with Professor Catherine Mavriplis, the next Ontario NSERC Chair for Women in Science and Engineering.

Participants agreed that they felt they belonged to a stronger network of women engineering professors after the WELI “Advanced Leadership Conference” Syracuse NY, in 2004. Many at the conference identified these important personal outcomes: the networking opportunities, advice from experienced leaders and leadership assessment tools.

2010 Survey of Working Conditions for Engineers found that more women than men reported dissatisfaction with the workplace as a reason for leaving; reasons included dissatisfaction with travel requirements, job duties, work environment and opportunities for advancement.
Feedback on personal outcomes from WELI participants:

“Seeing more senior female leaders and their perspectives, abilities, traits.”

“To learn strategies for dealing with difficult faculty, some strategies that have worked for others.”

“Assessment of my leadership skills; identification of some mistakes that I have made...and recognition of ways to avoid making them again.”

“It is crucial to understand one’s leadership style to manage and change organizations.”

The 2010 WiSE International Symposium in Syracuse brought together faculty and administrators to discuss the effectiveness of policies and practices to increase the participation of women in STEM disciplines. A book proposal – “Networking Around the Globe” - is being developed to compile the lessons learned from the conference and to expand the case studies to six countries.

By building the NATIONAL NETWORK CWSE®, Val obtained funding to allow face-to-face meetings of the regional Chairs and support for national research projects. A stronger network has resulted in broader dissemination of CWSE activities and has become a point of connections with national advocacy efforts such as ENGINEERS CANADA’s initiative to achieve 30% women in engineering by 2030. NSERC® has also agreed to provide additional resources to enable each CWSE to hire a postdoctoral fellow or research engineer during the term of the Chair. This assistance is critical for transitioning back to a regular faculty role from the CWSE position.
COLLABORATION

LINDA HAWKINS is the former Executive Director of the Centre for Families, Work and Well-being, and now the Director of the Institute for Community Engaged Scholarship and the Research Shop at the University of Guelph. She is a key supporter and collaborator with CWSE-ON and provides unique insights from outside the science and engineering community.

How can we bring social scientists and scientists together in a way that each community develops an appreciation and understanding of the methods of the other?

“Scientists and social scientists need to come together with ongoing, planned projects in order to sustain their collaborations. Val has recognized that the issues for women in S&T are social problems and can be worked on with the benefit of social scientists’ understanding of gender and its complex analysis.

The challenge is to figure out what is going on in the culture. This involves not just looking at numbers but also figuring out how the system works. The arguments need to be laid out for both communities.”

Impact of CWSE-ON on the community of academics at the University of Guelph and beyond.

“It is deeply important that the Chair created linkages between and among scientists and social scientists. It is foundational that she built early bridges and was the mortar between the bricks. The work revealed where the issues are. It is valuable for all our work to figure out how we don’t fit together. As a result of Val’s work, there are more social scientists at University of Guelph who know, understand and are interested in the issues. Research is being done in team settings. The flow of relationships between the Chair and individual faculty expertise has contributed to interdisciplinary understanding.

Beyond the University of Guelph, Val led in linking researchers across Canada and raising the value of social science. She opened the doors for the possibility for social scientists’ research. The National Network CWSE is addressing these issues because the pathways have been built. Good ways of working together continue to be created. Junior faculty members who have an interest in these issues now have a place to go.”

RUBY HEAP is a Professor of History at the University of Ottawa. She collaborated with Val on projects that brought together scientists and engineers with scholars from the social sciences and humanities.

What are the benefits of interdisciplinary research on the under-representation of women in science and engineering in Canada?

“Interdisciplinary research projects led by women scientists and engineers and grounded in social science theories and methodologies will produce more in-depth and sophisticated analyses of an issue that is of great concern to governments, professional associations, policy-makers and educators.”

How did Val lead this change?

“Val was able to persuade representatives from SSHRC that there is a critical need to fund [this] interdisciplinary research which was a highly innovative and groundbreaking move. She is a key player in the promotion of women in STEM in Canada and abroad.”
During the CWSE-ON term, resources could be found on the Chair’s website. They are now stored in the Atrium.

“Gender and Communications”
Training kit: materials for facilitators and report on 2006 workshops

Institutional Support Literature Database
a searchable database of documents on the subject effective institutional practices to support women in science and engineering

Papers have been published on research themes related to the CWSE-ON program.


Darisi, T., Davidson, V.J, Korabik, K. and S. Desmarais “Commitment to graduate studies and careers in science and engineering: Examining women and men’s experiences” 2010

Smit Quosai, T., Davidson, V.J., Ghazzali, N., Moloney, C., and J. Vassileva. “Defining Equity Indicators for Benchmarking Women’s Participation in Science and Engineering Faculties across Canada” 2010

Fender, J., Davidson, V., Vassileva, J., Ghazzali, N. and Croft, E. “Perceptions and Experiences of the Workplace among Canadian Computer Science and Engineering Students – A Gender Analysis” 2011

Presentations by the Chair to the wider academic and professional communities raised awareness of issues and supportive strategies to advance women’s careers in science and engineering.

Some highlights:

Promoting an Open & Positive Climate for Women in Science and Engineering at the Faculty of Engineering, University of Auckland, New Zealand 2009

Gender and Engineering in Canada, Sociology seminar at the University of Wuppertal, Germany 2008


Mentoring along the Academic Journey at “Celebrating Women in Computer Science and Engineering” conference, Toronto 2004

Exploring Mentoring for Women in Academe at the Leadership Conference of the Society of Women Academic Administrators in Canada, Waterloo 2004

There is a need to have a suite of best practices – to combine NSERC policy with mentoring and advice to young researchers on how to present personal information in a research application.”

Valerie Davidson
COMMUNICATIONS

When current affairs overlapped with the issues of women in S&T, Val was asked to respond.

CBC Radio The Current, May 20, 2010. Women Research Chairs - After the announcement of 19 successful candidates for the Canada Excellence Research Chairs program, Anna Maria Tremonti reported that this had been hailed as an international coup for Canada. She went on to state,

“All are considered top in the field; they were all lured to Canada in part by 190 million dollars in federal funding and they are all men.”

Val was asked to comment on why no women were selected for the jobs. She responded that there is a structural problem - recognized research leaders are largely men. To change this requires a different kind of search.

“Searches [for candidates] tend to be conducted through networks. When those networks are male-dominated, you need to find ways to seek out women, to make sure that you are looking broadly.”

Val was interviewed about the Nature report (2010) on salary gaps for women scientists. The interview was broadcast on 11 CBC radio stations across Canada from St. John’s to the Yukon.

Val was asked to comment on progress in recruiting women into engineering at the 2009 Ontario Centre for Engineering and Public Policy Conference –

“When contemplating their careers in engineering, undergraduate and graduate students benefit from support in two key areas – their perception of their own competencies in a complete set of professional skills, and a full awareness of the range of opportunities and pathways to success.”
IN EACH CHAPTER OF THIS REPORT, it has been shown how the work of the CWSE-ON program has made an impact. Short-term indicators include numbers of participants and responses to voluntary surveys administered at the end of events.

Participant statistics indicate that the CWSE-ON program engaged a large and diverse group of people. Growth in numbers over the eight year term was fuelled by additional financial resources for the renewal term as well as a “ripple” effect of network collaborations.

Qualitative evidence of impact comes from the participants’ comments that show their excitement, increased interest in science and technology and awareness of new opportunities. Parents, teachers and leaders have indicated their commitment to supporting the Early Enthusiasts’ interest in science and technology. We know this support is important based on feedback from our 2010 survey of undergraduates:

51% female students indicated that encouragement from family and friends was a factor in their decision to enter engineering.

Follow up with participants in the WiSE Outreach Weekend and Go ENG Girl/GÉNiales les filles indicates some intermediate-term impact of the events for Early Enthusiasts. Respondents indicated that these events influenced their choice of high school courses and post-secondary programs. In addition, the national survey of 4th year students in engineering showed that:

Pre-university activities that bring participants to a campus are more likely to influence the decision to enter engineering for women (15.8%) than for men (8.5%).

Based on our formal and informal evaluations, here are some of my thoughts about “What Works” and some of the lessons I have learned.
EARLY ENTHUSIASTS

Engage and inspire them with activities that emphasize collaboration and creativity in science and engineering; make sure that some events are for females only. Build a supportive community of parents, leaders and teachers to sustain interest over a longer term. Introduce them to Interested Intellectuals – they are very effective role models who inspire girls to be “confident, resourceful and courageous”.

Lessons Learned:

A large cohort of VOLUNTEERS is critical to successful connections with the Early Enthusiasts but management and support requires a significant investment of time.

FUND-RAISING and LEVERAGING FUNDS based on in-kind supports does increase reach of activities (e.g. OWD Partners for Change support for workshops in rural schools) but also requires investment of Chair’s time.

CONNECTING WITH SCHOOLS – RIM’s “Science Made Simple” Workshop is an excellent model of support for science and technology education in elementary classes.

INTERESTED INTELLECTUALS

Mentors compensate for the few role models in faculty; supportive male faculty are important in helping students develop professional identities. Connect students to the wider community of peers and professionals through conferences and workshops at national and regional levels. Provide coaching for transition to workplaces in the academy or industry.

Research supplies important information about what is going on in terms of culture and educational experiences. Collaboration with applied researchers in the social sciences is essential but the social scientists need to understand science and engineering cultures.

Lessons Learned:

RESOURCES – efforts are limited by availability of people (i.e. role models, mentors) rather than financial resources.

NEW GENERATION – each new cohort comes with its own context and values that must be understood.
PRODUCTIVE PROFESSIONALS

Research and education communities benefit from diversity in leadership. Support is important to encourage women to seek leadership roles in male-dominated environments. Systemic barriers and unintentional bias in hiring and promotion must be recognized and removed.

Improving retention requires flexibility for individuals to balance work with other responsibilities and ways to transition back from leaves.

Lessons Learned:

Knowledge mobilization is essential for sharing METRICS and EFFECTIVE APPROACHES to raise awareness and produce change. Policy alone is not sufficient – need acceptance by community and practical ways to implement. Building diverse WiSE COMMUNITIES is essential.

SUSTAINING CHANGE

The overall goal has been to increase the participation of women in science and engineering. Diverse talent fuels innovation and improves designs. Sustaining this transformation will be key. In 1996, Daryl Chubin and Shirley Malcom showed that sustainability of programs increases when commitment of individuals builds to engagement of entire organizations and when funding resources build from being insecure and unreliable to permanent.

Commitment

The CWSE-ON program benefited from the dedication of many individuals who acted as role models and as volunteers in various capacities. Beyond them, we look to the commitment of organizations to follow through on the programs that aim to increase recruitment and retention, to define appropriate metrics and to monitor change. This is starting to happen.

Resources

During my term as Chair, NSERC recognized the need to support the National CWSE Network in order to enhance and coordinate work at the national level. Recently new resources have been committed so that...
each Chair can maintain research productivity over her CWSE term. I see hopeful signs of evolution in the newly formed Standing Committee on Women in Engineering that reports to the Engineers Canada Board. The Board’s strategic goal is to increase the participation of women in engineering to 30% by 2030. On a regional level, I have ensured that ONWiE has resources to sustain activities.

**Continuing WiSE Conversations**

Continuing conversations and open lines of communication are also required for sustainability. NSERC, the National Network CWSE, Engineers Canada and WinSETT are talking about the need for a shared communications portal. I created a community within the Atrium repository that contains resources from the CWSE-ON program for the Chairs and others who want to engage in this work. Many other conversations are needed to keep in touch with audiences and to ensure that funders and professional organizations are aware of the impact of work.

**In closing…**

I know that the current generation of female students in science and engineering are capable and competent. These women will be successful wherever they choose to focus their careers. However, I wonder if the impact of our work will be sufficient to retain them. If they move on to where their talents are better nurtured and the culture is more welcoming, it will be a loss to science and engineering as well as Canadian society.

My vision aligns with that of Dr. Shirley Tighleman who said that we should strive for “unrestricted opportunity … when every woman who pursues a career in science or engineering can do so with the confidence that nothing contrived by human prejudice stands in her way”. If we achieve this, “men and women can both look forward to a scientific enterprise and a society that is fairer, stronger and more fulfilling – for all”\(^{10}\).
1 In The Decade Report: Making Change, Linda Hawkins used the idea of mobilizing knowledge to organize and describe the contributions of the Centre for Families, Work and Well-Being. Linda Hawkins was a key strategist in developing CWSE-ON initiatives and she shared valuable knowledge and resources with the program.


3 Youth Science & Technology Outreach Program funded by the Ontario Ministry of Research and Innovation

4 2011-2012 CAUT Almanac of Post-Secondary Education in Canada – Table 3.13

5 Engineers Canada, 2010.


7 CiSters website http://www.cisters.ca/node/154 accessed 1 September 2011.


10 Shirley Tilghman, Friesen Prize in Health Research Lecture, Queen’s University, 1 October 2010, Kingston, ON.
acknowledgements.................................

CWSE-ON STAFF

Some of the most rewarding personal experiences while I was Chair were the opportunities to work with the intelligent and motivated women who served as CWSE-ON staff. The CWSE-ON program would not have been successful without these key contributors:

**Project Managers**
- Janice DeMoor
- Jenny Fender
- Simone Saunders
- Melanie Veltman

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- Jason Newberry
- Betty Onyura
- Trudy Smit-Quosai
- Linda Yuval

REGIONAL CHAIRS FOR WOMEN IN SCIENCE AND ENGINEERING

Each Chair brings unique experiences and perspectives to our WiSE conversations. Working with these remarkable women has been inspiring and a lot of fun.

**Claire Deschênes**
- Quebec
- 1997 – 2005

**Elizabeth Croft**
- BC & Yukon
- 2010 – present

**Cecilia Moloney**
- Atlantic region
- 2004-2009

**Anne Condon**
- BC & Yukon
- 2004-2009

**Nadia Ghazzali**
- Quebec region
- 2004 – present

**Julita Vassileva**
- Prairie region
- 2006-2011
Paula Klink and Dean Tom Harris (Queen's University) were key supporters in getting ONWiE started in 2005. ONWiE members represent the 15 Schools/Faculties of Engineering in Ontario.

Christina Allsop
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Linda Coughlin
Cynthia Dunning
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Tara Egan
Krista Elliot
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Mireille Gascon
Darlee Gerrard
Ed Guerra
Marnie Ham
Jennifer Hinton
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Regina Lee
Li-Lian Lui
Mielan Lui
Catherine Mavriplis
Barbara McCann
Valerie Michaud-Lal
Christine Moresoli
Safaa Mohamed
Lesley Mounteer
Heather Moynihan
Katherine Newcombe
Raluca Nuta
Michele Oliver
Ana Popovic
Lisa Renaud
Laura Resendes
Lisa Romkey
Lionel Rudd
Martin Scherer
Rosalyn Seeton
Heather Sheardown
Frankie Stewart
Ramesh Subramanian
Allison Tapak
Bryan Tolson
Edwin Tam
Ladan Tahvildari
Brenda Tucker
Mauwena Torkornoo
Carm Vespi
Mary Wells
Adam Wingate
Rohini Wittke
Andrea Woon-Fat

Acknowledgements...

ONWiE Members

Funding from the Ontario Women's Directorate and Ann Holmes' facilitation skills were key to bringing this consortium together. Additional funding through YSTOP (Ministry of Research and Innovation) allowed the network to expand.

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Heidi Schraft (Lakehead University)
Catherine Hammond (Let's Talk Science)
Lisa Anderson & Kim Gilbride (Ryerson)
Helen Francis (WiSE Sudbury)
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- Serge Desmarais (Guelph)
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- Nadia Ghazzali (Laval)
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- Karen Korabik (Guelph)
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- Hiromi Matsui (Simon Fraser)
- Cecilia Moloney (Memorial)
- Marta Rohatynskyj (Guelph)
- Vivian Shalla (Guelph)
- Warren Stiver (Guelph)
- Julita Vassileva (Saskatchewan)
- Beth Weckman (Waterloo)

**RIM**

Staff working in educational programs and outreach developed the *Science Made Simple* workshop.

- Karen Klink
- Valerie MacDonald
- Jinty Smith

**WELI**

The WELI network was a great support and I worked very closely with Shoba Bhatia (Syracuse University), Kelly Rusch (Louisiana State University) and Judy Vance (Iowa State University) on the Advanced Leadership Conference.

**VOLUNTEERS**

Thousands of students, faculty, staff, alumna and others helped to make the CWSE-ON program successful.

I know that they will continue to build on this success and I am grateful for their commitment and enthusiasm.

**SPONSORS**

![NSERC CRISNG](nserc.png)  ![HP](hp.png)  ![RIM](rim.png)  ![University of Guelph](uguelph.png)
THE ATRIUM is a digital repository at the University of Guelph library.

Within the College of Physical and Engineering Science community, two collections have been created to preserve materials from the CWSE-ON program and from the National Network of Regional Chairs for women in science and engineering.

https://atrium.lib.uoguelph.ca/xmlui/handle/10214/2694

NSERC Chair for Women in Science and Engineering - Ontario (CWSE-ON) 2003-2011

https://atrium.lib.uoguelph.ca/xmlui/handle/10214/2695

National Network of Regional Chairs for Women in Science and Engineering
Executive Summary

"Joining WiSE Conversations: Strategies & Successes from CWSE-ON" is a record of initiatives undertaken by Professor Valerie Davidson and her team as part of the Chair for Women in Science and Engineering - Ontario (CWSE-ON) program. The CWSE-ON program aimed to encourage young women into post-secondary programs in science and engineering, and to retain them as valuable contributors to professions in these fields.

CWSE-ON initiatives are described in three sections by audience: Early Enthusiasts, Interested Intellectuals and Productive Professionals. Each section outlines activities, describes results, highlights the essential collaborations, and indicates sources for the knowledge and resources that were developed.

CWSE-ON strategies included engaging with those adults who influence young girls (e.g. parents, teachers, Girl Guide leaders), collaborating with groups that have similar goals, inspiring girls and women through role models, and advocating to leaders and the public. This report emphasizes the value of conversations and collaborations, the networks tapped and created, and the need for change – change in ways of thinking, in education and workplace culture. Through these efforts, there will be change in the participation rate of women in science and engineering, particularly those in the next generation of students, professionals and leaders.

The CWSE-ON program was supported by NSERC, Hewlett-Packard Canada (2003-2008), Research in Motion (2008-2011) and the University of Guelph.