



**NSERC
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Chair for Women in Science and Engineering
BC and Yukon Region



WVVEST

Westcoast Women in Engineering,
Science & Technology

Annual Report

Year 3: September 2012 to August 2013

Engendering Engineering Success

A Social Sciences and Humanities Research Council of Canada Partnership Development Grant

How can industry support the real situation of women working in engineering careers? An important question, but not an easy one to tackle.

The NSERC Chair for Women in Science and Engineering, BC/Yukon, Dr. Elizabeth Croft is the Principal Investigator (PI) in a new SSHRC funded Partnership Development Grant focused on just that question.

Engendering Engineering Success (EES) will study, develop, and disseminate policies, practices, and interventions that both support and reflect the real situation of women working in engineering careers. A key deliverable of the project is knowledge translation - how can our findings be applied in the workforce?

To get a holistic view of the situation, a team of investigators, collaborators, and partners have been assembled with a variety of backgrounds and perspectives. The Co-PIs on this project are Dr. Toni Schmader, Professor of Social Psychology, UBC and Canada Research Chair; Dr. Michelle Inness, Professor of Business, University of Alberta; and Dr. Valerie Davidson, Professor Emerita of Engineering, University of Guelph. Dr. Davidson is a former NSERC CWSE for Ontario. Courtney Hughes and Lianne Lefsrud are Collaborators on the grant. Partnering on the project are Engineers Canada, the National Network of Chairs for Women in Science and Engineering, the Canadian Centre for

Women in Science, Engineering, Trades, and Technology, the Mining Industry Resource Council, WorleyParsons Canada, and Enbridge Pipelines Inc.

The project will be centred around three streams:

1. Organizational Study of Best Practices. This broad survey of organizational policy will help develop "dashboard statistics" for diversity practices.
2. Climate Science: Surveying Women's Experience in Engineering. Researchers will survey both male and female engineers about policies and workplace experiences to identify policies and procedures that correlate with better employment outcomes for women.
3. Pilot Interventions. These interventions will integrate and translate knowledge into the workplace.

EES is currently compiling a list of companies interested in participating in one or more of the streams. Commitment requirements will vary, and we anticipate details to be available by late fall.

To receive regular updates on this project, and opportunities for companies to participate and benefit, please contact:

Engendering Engineering Success
c/o Jennifer Pelletier, Program Administrator
ees.research@mech.ubc.ca



a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA



About the Chairholder

Elizabeth A. Croft (Ph.D., P.Eng., FEC, FASME) is the NSERC Chair for Women in Science and Engineering, (BC & Yukon Region), and a Professor at The University of British Columbia (UBC). As Chair, Dr. Croft leads Westcoast Women in Engineering, Science, and Technology (WWEST) whose mission is to promote Science and Engineering as an excellent career choice for women and other under-represented groups, and to identify and eliminate barriers that result in attrition from these career paths. Dr. Croft has been selected to Chair the National Chairs for

Women in Science and Engineering Network, connecting and linking the five regional NSERC Chairs to share best practices and strategize on a broader scale.

Dr. Croft is the Director of the Collaborative Advanced Robotics and Intelligent Systems (CARIS) Laboratory at UBC. Her research investigates how robotic systems can behave and be perceived to behave in a safe, predictable, and helpful manner, and how people interact with and understand robotic systems. Her research has recently been featured in *The Economist* and *The New York Times*.

Staff Members

Manager:

Jennifer Pelletier

Program Assistants:

Janet Fraser (began September 2013)

Noor Teja (January 2012 - June 2013)

Justin Yang (May 2012 - July 2013)

Student Assistants:

John Koo

Vivian Meng (Statistics)

Rebekah Parker

Anoushka Rajan

Activity Sampler

WWEST is involved in so many different projects it is impossible to feature them all here. Other highlights from this year include:

- WWEST supported more than a dozen community non-profit organizations that undertake activities to promote outreach, recruitment, and retention for girls, young women, and industry professionals throughout the region. In addition to funds, WWEST provides training, support, networking, and contacts to help start and grow programs.
- Dr. Croft was recognized with a YWCA Vancouver Women of Distinction Award (Education, Training & Development) in May 2013.
- WWEST co-hosted an event for 90 female high school students, including a panel, lunch, and hands-on design activity.
- Dr. Croft was recognized with the WISEST Lectureship at the University of Alberta
- Keynote talks, including the Richmond School District "Introduce a Girl to Engineering Day," and the HR McMillan Space Centre "Women in Science" series.
- Publications include conference publications (Soc. Personality & Social Psych., CCWESTT, CEEA), and an article in APEGBC's *Innovation*, entitled "Diversity in Organizations - Why and How."
- Dr. Croft also served on committees such as the APEGBC Women in Engineering Task Force.

Presentation on Diversity in Organizations at APEGBC AGM

WWEST was invited to present on Diversity in Organizations at the APEGBC Annual General Meeting in Victoria, BC on October 25th, 2012.

Dr. Elizabeth Croft and WWEST Manager Jennifer Pelletier presented three sessions, including the "Benefits of Diversity in Your Organization," and "Building Leadership Diversity" sessions tailored specifically for managers and women engineers. They discussed material from both WWEST and WinSETT Centre, including WinSETT's "Increasing Women in SETT: The Business Case" and the outcomes of the WWEST study on the WinSETT Centre "Becoming Leaders" workshops in BC.

Working Climate Study at UBC Applied Science & UBC Science for the Enhancement of Diversity and Equity for Faculty Members

Under the leadership of Dr. Croft and Dr. Vanessa Auld (Associate Dean, Science), this study aims to identify potential gaps and best practices to develop recommendations for the Faculties' efforts to advance equity, diversity and working climate for faculty in alignment with UBC's employment equity and respectful working environment goals. It follows a previous Working Climate Study in the Faculty of Science in 2007, and is the first of its kind for the Faculty of Applied Science. The findings are expected to be released in fall 2013.

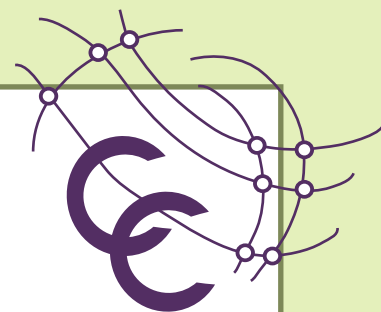
We Welcome Your Invitation

Dr. Croft and WWEST speak and present workshops throughout the region. We are often asked how we pick our locations, and the answer is simple - we were invited!

Please contact us with enquiries.

Creating Connections 2013 | Biennial Regional Conference | May 10-11, 2013

300 participants attended the third biennial Creating Connections conference from May 10-11, 2013 at the University of British Columbia. The event featured keynote speeches including:



- The Role of Gender in Science Communication
 - Moderator Dr. Jennifer Gardy (Senior Scientist at the BC Centre for Disease Control, & recurring guest host for *Daily Planet*)
 - Bob McDonald (Host of CBC Radio One's *Quirks and Quarks*)
 - Dr. Carin Bondar (Host for Discovery International & blogger for *Scientific American*)
 - Cam Cronin (Public Programmer, HR MacMillan Space Centre)
- Dr. Roberta Bondar (the world's first neurologist in space & Canada's first female astronaut)
- Anna Tudela (Vice-President of Regulatory Affairs and Corporate Secretary, Goldcorp Inc.)
- Dr. Amiee Chan (CEO, Norsat)

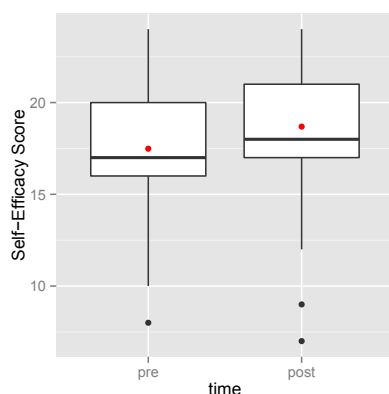


Dr. Croft and Jennifer Pelletier facilitate an interactive session on diversity in the workplace.

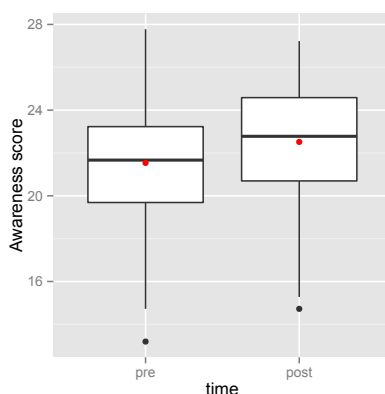
Attendees engaged in meaningful dialogue about the participation of women in science, engineering and technology through interactive workshops, networking sessions and keynote speeches. Beyond networking, community building, and access objectives, the conference was also used as a case study to determine how effective this type of activity can be at improving occupational self-efficacy - a strong predictor of career persistence - and whether we can effect a measurable change in someone's awareness of the value of gender diversity in the technical workplace.

To measure self-efficacy, WWEST chose to use an adapted version of the scientifically validated Rigotti, Schyns, and Mohr's (2008) Occupational Self-Efficacy survey. A literature review did not, however, yield a test for measuring a person's awareness of the value of gender diversity in the technical workplace. Recognizing a need we could fill, we designed a set of 18 short questions targeting three facets of awareness- action, empathy, and knowledge. These questions were then validated through testing. We expect that this research, and the instrument as a whole, will be published in the new year. We also intend to continue our evaluation through longitudinal research.

As shown below, the Creating Connections conference resulted in statistically significant ($P < 0.001$) positive changes for both participant's occupational self-efficacy (indicating career persistence), and their awareness of the value of gender diversity.



The Self-Efficacy Survey is scored out of 24 points.
Pre-event average: 17.5
Average increase: +1.27
Statistically significant? Yes, $P < 0.001$



The Awareness Survey is scored out of 30 points.
Pre-event average: 21.5
Average increase: +0.97
Statistically significant? Yes, $P < 0.001$

How to read a box-and-whiskers plot:

- The quartiles of the scores are represented by the area above the box, the top half of the box, the bottom of the box, and the area below the box;
- The box illustrates the experience of half of the respondents, while the whiskers show the extremes;
- The movement of the line shows the change in the median score;
- The movement of the red dot shows the change in the average score.

The conference evaluation was administered as a pre- and post- test. A total of 153 responses were collected out of 300 participants, a response rate of about 50%. Because our inference is centered on the question, "On average, did attending the conference create positive change for the conference participants," finite population inference is used. Taking the finite population inference approach allows us to factor in the appropriate amount of confidence brought by a 50% response rate, done by reducing the sample variance used in a paired t-test by a finite population correction factor that takes account of the representativeness of sample score.

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