

Mind the gender gap: Women in STEM

Pink is for girls and blue is for boys. To girls and women, a career in STEM is perfectly packaged in a big blue box, placed on the highest shelf of the toy store – sometimes in sight and often times, out of reach.

Written by **Carmen Wong**

Photo by **Martin Lipman/NSERC**

She fell in love with the stars at 12 years old. She was fascinated with the constellations and how they formed and what they looked like. On clear summer nights, she would lay under the stars and pretend she had travelled back in time. She says when you see a star that's light years away, you're actually seeing it as it looked in the past. And like the stars that aligned to form the constellations, she says it just made sense for her to pursue a career in science.

Madeleine Bonsma-Fisher is not a time traveller or space traveller, but her curiosities about the world are at an all time high. She is an award-winning PhD student at the University of Toronto studying biophysics, researching microbiology, and fighting against the odds to succeed in the male-dominated science industry.

"I never thought just by being a woman, it would put me at a disadvantage," says Bonsma-Fisher.

The science, technology, engineering, and mathematics (STEM) fields are notoriously known as a boys' club. Women represent 22 per cent of the STEM workforce, a number

that has held fairly steady over the past 30 years. According to the United Nations, in 1987, only 20 per cent of those working in STEM fields were women. That percentage has since inched up just 2 per cent, despite an increase in the number of women graduating with STEM degrees. Even when women achieve careers in STEM, they are often forced out – not because they cannot juggle babies and Bunsen burners, but because they are discouraged at every turn by thousands of small, sexist moments that make them feel unwelcomed. Embedded barriers such as gender biases and stereotypes in the male-dominated field have been an intimidating force that has discouraged female participation for decades.

"The hardest part is being the only one like you," says Bonsma-Fisher. She says there is a dispiriting sense of isolation from being the only woman in the room. In her first year of graduate school, she was one of four women in a class of 34 students. At her first co-op job, she worked for a team that was fully staffed by men. Bonsma-Fisher says she has become used to being the minority in terms of gender, but it is not easy. She says there is a pressure to be a voice for women; everything she says or does in a room of men not only reflects back on herself but on women as a whole. And it happens often. Bonsma-Fisher says she is asked to do outreach by her graduate department at a higher rate than

UNLOCKING POTENTIAL

her male colleagues. She says she thinks it is because they want to appear more diverse. But the reality is, STEM is not diverse.

While reports on how to tackle the leaky pipeline issue that is attracting and retaining women in STEM, the few women in the field experience subtle and sometimes, not so subtle, discrimination. A 2014 study conducted by PLOS One found that 64 per cent of female scientists have been sexually harassed and one in five have been a victim of sexual assault. She says now on the heels of the Me Too and Time's Up movements, STEM is no exception to the problem. "We're seeing that harassment and sexual assault is a huge problem in almost every field, and that's true for academia too," says Bonsma-Fisher. While she was a teaching assistant, she was harassed by a student that acted inappropriately towards her. She says the student even emailed her supervisor to be assigned to her group. Fortunately, Bonsma-Fisher's supervisor sided with her.

Although women are enrolling in science and engineering in record numbers, the truth is, very little has changed for women in STEM, says Christin Wiedemann. Wiedemann is the president of the Society for Women in Science and Technology (SCWIST), a Vancouver-based organization aimed at promoting, encouraging, and empowering women in STEM. She is also a PhD physicist and chief scientist at PQA and has worked in the male-dominated science industry for the majority of her career. "We like to think that gender inequality in STEM is old-fashioned and that as a society, we've made great advances, but the numbers don't always tell the same tale," says Wiedemann.

A 2014 report called "Double Jeopardy?" by Tools for Change, a California-based STEM advocacy group looked at gender bias against women in science. They found that 34 per cent of women felt pressured to take on dead-end "feminine" roles such as scheduling meetings and fetching coffees. The report also found that 53 per cent of women surveyed reported backlash for displaying "masculine" traits such as being assertive during meetings and 64 per cent had their commitment to work questioned

and opportunities dried up after having a baby. "Women walk a tightrope," says Wiedemann.

And she has been walking that tightrope for over two decades. She says there are a lot of challenges that women face in STEM, but the most difficult ones to overcome are implicit biases, even her own. Wiedemann says although she considers herself a diversity advocate, she cannot help but associate science with predominately male attributes. "It's important to talk about them and bring them to the surface so that we can try to change them from being unconscious biases to conscious biases," says Wiedemann. She says from there, men and women alike can start making changes.

"It's about acknowledging the problem. Until there's equality, there's a lot of work to be done."



While growing conversations about women in STEM are one thing, real change is another. And Doina Oncel agrees. Oncel is a social entrepreneur and the founder of hEr VOLUTION, a Toronto-based organization focused on giving women and girls from low-income families the best chance of a successful future in STEM. hEr VOLUTION provides services such as mentoring, youth outreach and networking opportunities. Oncel has been a leading voice on the issue of gender bias in STEM and is frustrated with the lack of progress in Canada. She says there must be action such as diversifying hiring practices, increasing mentorship, closing the pay gap, and addressing harassment. According to a report conducted by the Harvard Business Review, 52 per cent of highly qualified women in STEM quit their jobs, either giving up on the sector entirely or moving

to non-technical roles. The report states that women leave their jobs because of the hostility of the workplace culture and getting pushed into roles with no career advancement. "We need to create a culture that celebrates diversity as a competitive advantage, one that supports women starting families so that women can feel confident in succeeding in the workplace," says Oncel.

Despite difficulties to retain women in STEM, research on the scarcity of women has mostly focused on the pipeline issue: namely, the more women in undergraduate classes, the more will come out the other end. In a 2016 press release, the University of Toronto claimed that its first-year engineering classes have record-high female enrollment of 40 per cent. But according to Engineers Canada, national enrollment is 20 per cent on average and only 12.8 per cent of the country's 289-thousand engineers are women.

Syeda Anjum is a fourth-year student at the University of Toronto studying chemical engineering and is the president of Women in Science and Engineering (WiSE), a student organization that advocates for women in STEM. It promotes the professional and personal growth by harnessing their potential in a female-friendly learning environment. Anjum says before she joined WiSE, her ambitions were ordinary. "I didn't think that I would have the potential to do something significant," Anjum says. "But when you surround yourself with people that encourage you to dream bigger and push for more, that support system is everything."

Organizations such as SCWIST, hEr VOLUTION, and WiSE and the women who run them have stepped out and forged forward in collective action to drive real change for women in STEM. By breaking down barriers, addressing unconscious biases, and creating cultures of inclusion to achieve full gender parity within the industry, women in STEM have a better shot at success than ever. Ensuring gender equity in STEM is not just the right thing to do; it's necessary. "It's necessary because otherwise STEM is missing out hugely on talent and perspectives," says Bonsma-Fisher. "Diverse teams are better at doing creative and robust science." ■