Canada's two top science and engineering prizes awarded to women

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Two University of Toronto researchers – both women – have received the country's top awards in science and engineering from the Natural Sciences and Engineering Research Council of Canada. It's only the third time that a female scientist has won either award, and the first time that both top prizes went to women in the same year.

Dr. Molly Shoichet, PhD, received the coveted 2020 Gerhard Herzberg Canada Gold Medal for Science and Engineering. She is a distinguished professor of chemical engineering and applied chemistry, and biomaterials and biomedical engineering and holds a Tier 1 Canada Research Chair in Tissue Engineering.

"I have a great team of people working in my lab and amazing collaborators. While I am getting this medal, it's really such a great reflection of the team," Shoichet told Research Money.

The Herzberg medal is awarded annually to an individual who has demonstrated sustained excellence and influence in research for a body of work conducted in Canada that has substantially advanced the natural sciences or engineering fields.

It is the first time that the Herzberg award has gone to a female scientist two years in a row and the third time a woman has received the top prize. Dr. Barbara Sherwood Lollar, PhD, university professor of earth sciences also at the University of Toronto, won the Herzberg in 2019.

For Shoichet, the Herzberg comes with an increase in her NSERC Discovery Grant to $1 million over five years, from the original $450,000.

Dr. Karen Maxwell, PhD, an assistant professor of biochemistry at UToronto, received this year's John C. Polanyi Award. The award honours an individual or team whose Canadian-based research has led to a recent outstanding advance in the natural sciences or engineering. It includes a research grant of $250,000.

"It's very exciting to be recognized for my work and the work of my team," Maxwell said in an interview.

"As a scientist carrying out basic research, I'm particularly delighted that we're celebrating a curiosity-driven discovery. It's fundamental biology that my lab has been looking at."

Awards recognize breakthroughs in science

Shoichet, an innovative biomedical engineer who has founded four companies based on her lab's research, is a world leader in the area of using polymers for drug delivery and tissue regeneration. She invented a series of hydrogels that enabled cells to grow and interact in complex, three-dimensional cell culture, like they do in human bodies.

The Shoichet Lab has led development of several game-changing applications for hydrogels in the areas of tissue engineering, regenerative medicine and pharmaceutical testing.

The University of Toronto provides a supportive environment for multidisciplinary science, which is strengthened by colleagues at local research hospitals, Shoichet said. “I’ve been successful in the interdisciplinary field I’m in because it crosses engineering, science and medicine, and I have appointments in all of those faculties.”

Starting in November 2017, Shoichet also served as Ontario’s first Chief Scientist under then Premier Kathleen Wynne before the position was eliminated just eight months later by the newly elected Conservative government.

Biochemist Maxwell leads a team studying the soil-dwelling bacteria Streptomyces (which have been used to develop important antibiotics) to discover exactly how it fends off attacking phages – viruses that infect bacteria.

Bacteria have immune systems similar to humans. Maxwell and her team discovered that Streptomyces produces molecules that stop viruses in their tracks and prevent fast replication.

This breakthrough not only reveals a new discovery about bacterial biology, but also opens up a novel way to use phages to screen for drugs that could be used to treat human cancers and viral infections.

Shoichet and Maxwell have collaborated on projects and scientific papers, and they once shared lab space for several years.

“There’s a lot of outstanding research being carried out here at the University of Toronto,” Maxwell said. “We have lots of really talented colleagues. And, of course the women are equally as talented as the men.”

More hiring of women needed in STEM disciplines

While Shoichet and Maxwell both welcomed the higher profile their NSERC awards bring to women in science, both told Research Money that more needs to be done to retain women in the STEM disciplines (science, technology engineering and mathematics).

There’s a lot of focus on encouraging girls to get into STEM fields, which has resulted in more than 50% women being enrolled at the undergraduate level in such fields as medical research and biological sciences, Maxwell said.

“But it’s at the level of post-graduate school that we see a real falling off of women,” Maxwell noted. “One of the challenges is feeling like they belong, particularly in fields that are still male-dominated.”

Research shows that when women see other women in high-profile positions, it increases their sense of belonging, she added. However, in many male-dominated fields and especially at the faculty level, often more opportunities are offered to men than women, said Maxwell, whose lab is predominately female.

Although women comprised about 56% of all post-secondary enrollment, they made up only about 40% of all university teachers and less than 21% of women were teaching math, computer and information sciences, according to a 2018 report by the Canadian Association of University Teachers.

Shoichet, who sometimes sees one of her talented PhD students choose a different career, said: “It’s wonderful that women have choice, and we didn’t always. But I think we really have to continue to do a better job of hiring more women in STEM for faculty positions and then promoting them and giving them additional leadership opportunities.”

So what is the award-winning researchers’ advice for young women pursuing a science career?

“You have to have confidence in yourself and seek out opportunities. Don’t wait for opportunities to come to you,” Maxwell said.

Shoichet said science and engineering are crucial to a global, knowledge-based economy, “and there are so many opportunities to invent the future.”

Women in science should learn how to collaborate and take advantage of people with complementary knowledge and expertise, she said. “Pursue your career and recognize that it’s not easy . . . don’t try to do it all by yourself.”

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