

FEATURE STORY | 15-JUN-2022

McMaster professor harnesses space-age tech to fight cancer

At the forefront of a project to develop robot-assisted biopsy and diagnostics for breast cancer

MCMASTER UNIVERSITY



image: Mehran Anvari is at the forefront of a project to develop robot-assisted biopsy and diagnostics for breast cancer, using technology first pioneered on the space shuttle's Canadarm. [view more >](#)

Credit: St. Joe's Audio Visual Team

By Fram Dinshaw

Mehran Anvari has always been something of a pioneer, having performed one of the world's first remote-controlled robotic surgeries. He was in Hamilton; the patient was in North Bay.

The McMaster University professor of surgery tested how remote surgery could be done in space, working with NASA astronauts in a laboratory 19 metres underwater off the Florida Keys.

Anvari is now at the forefront of a project to develop robot-assisted biopsy and diagnostics for breast cancer, using technology first pioneered on the space shuttle's Canadarm.

He is furthering his vision with Paul Chipperton, CEO and president of Insight Medbotics Inc. (IMI), through a \$435,000 grant from the McMaster Seed Fund (MSF). They plan to market their product in the large US market.

"The care patients receive for breast cancer is still not ideal, and while MRI scans can provide highly detailed images, they may detect small lesions that may or may not be cancer and must be checked by radiologists in big-city hospitals," said Anvari, who is the scientific director and CEO of the Centre for Surgical Invention and Innovation.

Anvari is also the founding director of both the Centre for Minimal Access Surgery, the McMaster Institute for Surgical Invention, Innovation and Education and a surgeon at St. Joseph's Healthcare Hamilton.

Anvari's work in robotic medicine was recognized by NASA in 2015, for his work on the image-guided automated robot (IGAR) that detects cancerous lesions, in doing so bringing space technology back to Earth.

IGAR works in combination with MRI scanners to find lesions. The robot streamlines the manoeuvres involved in MRI scanning, in turn speeding up patient flow through the clinic.

"By automating this procedure using robotics, we can avoid the need to transfer patients to specialized hospitals. Instead, we are providing improved care to patients wherever they live," said Anvari.

Chipperton said that every woman over 40 should at least have an annual mammogram, but these X-rays do not always detect cancerous lesions. Mammograms are even less effective in women with 'dense' breasts, as both regular and cancerous tissues appear similar in these patients.

According to independent clinical sources, more than 25 million American women of breast cancer screening age have dense breasts, and others also have a genetic pre-disposition to breast cancer, making accurate and detailed scans essential.

While MRI scans are recommended for such patients, a lack of trained radiologists in rural and remote communities means many women who need MRIs often go without.

“Eventually we intend to build robots that can provide ‘one-stop shopping’ for diagnostics, biopsies and treatment for patients in remote areas, but we still need the regulatory approval,” said Anvari.

Chipperton said that, for now, IMI is focusing its marketing efforts on the United States, as its for-profit health-care system can quickly implement and adapt to new technology.

He said the Canadian health-care system, by contrast, responds much more slowly to innovative new technologies like IGAR.

“American health-care systems pay. If there is both a supply and a demand, a transaction will take place,” said Chipperton.

“We are finishing the relevant documentation we need to submit to the US Food and Drug Administration for regulatory approval within the next six months.”

However, Chipperton said IMI’s new product will still be rolled out in Canada, with high-profile medical professionals in major cities using and validating the robotic MRI platform.

He said that once radiologists, oncologists and others in the breast cancer care community use such systems and provide feedback, the robotic technology can be more widely implemented.

“Mehran believes there will be a trickle-down as the robotics technology is perfected, to deliver telemedicine in rural and remote Canadian communities,” said Chipperton.

“Our ultimate vision is a national health care system that is available from Toronto to Tuktoyaktuk, made possible by telemedicine and robotics.”

Since he conducted his first telerobotic surgery in 2003, Anvari’s robotics prowess has led to research support from the Canadian Space Agency and NASA, with 12 patents being created.

Anvari said the robotics technology under development could be used in future crewed space missions to help astronauts in medical distress, including to the moon and Mars.

Chipperton is well-versed in bringing such innovative ideas to market, as he already has 30 years of launching tech start-ups and also teaches part-time for McMaster University's Master of Engineering/Technology Entrepreneurship & Innovation program.

Before helming IMI, Chipperton was co-founder and CEO of Profound Medical Inc., where he raised more than \$16 million in funding to establish clinical trials of a new MRI-guided thermal treatment for prostate cancer.

His former start-up is now listed on both NASDAQ and the TSX.

"Not many people get to work on projects and build companies that can change people's lives, both figuratively and literally," said Chipperton.

"There is an altruistic satisfaction that you don't get with most jobs."

Chipperton said that IMI is well ahead in its regulatory and pre-commercialisation activities, although financing for the new robotics technology is still in its early stages.

He said the McMaster's support is a key driver of IMI's success.

"The McMaster Seed Fund is absolutely vital for us in securing regulatory clearance, which is among the most challenging goals of any medical technology company, and the most valuable inflection point in any company's life," said Chipperton.

Karen Mossman, McMaster's vice-president of research, said IMI's proposal was one of 18 submitted to the McMaster Seed Fund from a variety of disciplines within the faculties of engineering, science and health sciences.

"The McMaster Seed Fund was designed to foster our culture of commercialization and social innovation across the university in an effort to positively impact society and it is certainly living up to its mandate," said Mossman.

The fund was established to enable start-ups at the university to complete value-add experiments or validate their market that will best position them for a series A investment. IMI was recommended for funding based on the quality of the team and the technology.

The McMaster Industry Liaison Office manages the fund.

Disclaimer: AAAS and EurekAlert! are not responsible for the accuracy of news releases posted to EurekAlert! by contributing institutions or for the use of any information through the EurekAlert system.

Media Contact

Veronica McGuire
McMaster University
vmcguir@mcmaster.ca
Office: 905-525-9140 x22169
