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Sunnybrook Research Institute is a commercialization powerhouse

BY JERRY ZEIDENBERG

TORONTO – An advanced laboratory is at the heart of Sunnybrook Research Institute’s success in converting ideas about image-guided therapeutic devices into real-world products and solutions. “It’s unique in Canada and possibly in the world,” commented Kevin Hamilton, director, strategic research programs at SRI. “No one else has an integrated facility like this.”

The 10,000 square foot lab sits at the top of a seven-storey tower, and contains everything from machinist’s lathes to 3D printers and a current Good Manufacturing Practices (GMP) centre, an ultra-clean facility for producing devices that can be inserted into the body.

Called the Device Development Laboratory, “It’s got anything you’d need to build a device or product,” said Hamilton, who noted the lab can quickly turn an idea into a prototype, ready for testing.

What’s more, the lab has a core of skilled developers who work closely with scientists and clinicians.

“We have many clinician-scientists who come up with ideas and want to turn them into products, to benefit patients,” said Hamilton. “Some of them have created companies, and work here to produce prototypes.”

At the same time, he noted that representatives from private companies are

often visiting, as they’re meeting with scientists, developers and clinicians as part of the commercialization process.

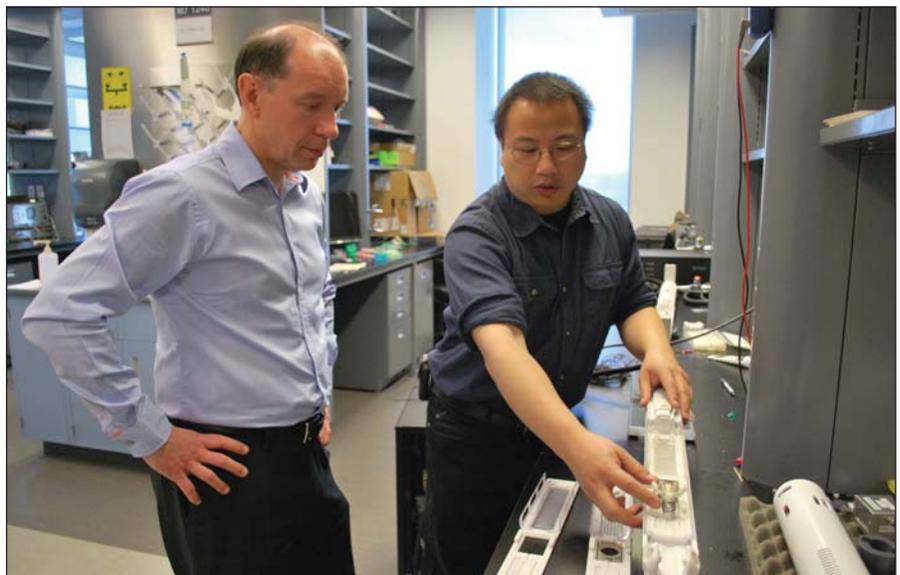
“We can churn out prototypes in days, as opposed to the weeks this process usually takes,” said Anthony Chau, a machinist at the Device Development Lab. Chau also has training in electronics.

He observed that rapid prototyping of medical devices can be done at the DDL not only because the machine tools and facilities needed are all in one place, but because talented people with a wide variety of skills are working together.

“SRI combines all the skills that are needed,” said Chau.

Sunnybrook Research Institute has become a powerhouse in the creation and commercialization of image-guided devices for researchers and clinicians. In recent years, the organization has formed partnerships with more than 18 private-sector companies and has refined 23 image-guided technologies, some of which are now being sold internationally.

A \$74.6 million award, the largest grant in the hospital’s history, was announced in 2008 by the Canada Foun-



Anthony Chau (right) demonstrates new technology to Kevin Hamilton at the Device Development Lab.

dation for Innovation's (CFI) Research Hospital Fund, and was used to establish the Centre for Research in Image-Guided Therapeutics.

In 2012, the government of Canada's FedDev Ontario provided funding of \$6.9 million, which was used to help commercialize promising technologies.

And in April of this year, FedDev Ontario strengthened the image-guided medical device cluster at SRI with a \$20 million grant, a sum that will lead to more than \$40 million in total investments through matching contributions from industry partners.

The money will be used to spur the commercialization of 28 different technologies, through collaborations with partners that include up to 28 businesses and four other universities – Western University, University of Toronto, Queen's University, and Ryerson University.

Hamilton explained the new money will largely be used to attract skilled people needed to further develop promising technologies and help bring them to market. If the lab and panoply of equipment are at the heart of the SRI, people are still the brains that come up with the ideas and bring them to fruition. "It's all about the people," said Hamilton.

Many of the technologies developed at the centre involve the use of ultrasound or MRI, two of the dominant imaging modalities used today. SRI has MRI scanners from GE and Philips, and will soon add one from Siemens, the third major maker of MRI technology. Hamilton notes that will help researchers and developers,

who like to ensure their solutions are compatible with all of the leading brands.

Some of the technologies and companies that have been spun out of research at SRI, and that will be further developed, include:

- Calavera Surgical Design Inc., which has developed patent-pending technology and methods to help surgeons create custom patient-specific implants in the operating room using a compressive mold system. This technology will be marketed as two products: a kit for skull and face

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implants and a kit for eye socket implants. The technology is also suitable for other applications such as forming surgical guides and templates.

- Focused Ultrasound (FUS) Instruments, spun out of research done in the lab of Dr. Kullervo Hynynen, director of Physical Sciences at SRI, is developing a novel focused ultrasound phased-array system that allows noninvasive and precise delivery of ultrasound through tissue without mechanical motion.

- Harmonic Medical Inc. is developing three novel clinical beta-prototype focused ultrasound systems for noninvasive surgery and precise delivery of energy to ablate tissues deep in the body. The unique features of different anatomical

targets are used to design, construct and test devices for the treatment of uterine fibroids, back pain and vascular diseases.

- Innovere Medical Inc. is a start-up company established by researchers Drs. Kevan Anderson and Garry Liu, working in the lab of Dr. Graham Wright, director of the Schulich Heart Research Program at SRI. Together, they invented a wireless headset system to facilitate audio communication between clinicians and research teams working inside a noisy magnetic resonance imaging (MRI) scanner suite and the adjacent console room.

- PathCore Inc. is a startup company in Toronto that was created in 2011 by Dr. Anne Martel, a senior scientist in the Odette Cancer Research Program at SRI, and Danoush Hosseinzadeh, a former SRI research engineer.

The company is creating an integrated platform capable of storing and serving whole-slide histopathology images for analysis of tumour burden, tissue damage, and other pathological features. It is also the first software company in the world to offer a DICOM (digital imaging and communications in medicine) compliant server for digital pathology.

Hamilton observed that SRI is advancing patient care in hospitals, including Sunnybrook, through its innovation, and is also creating economic benefits through its research activities. "We've created 14 spinoffs in the last 12 years, and all are alive," he said. A few have been sold to larger companies, but the manufacturing facilities have remained in the Toronto area.